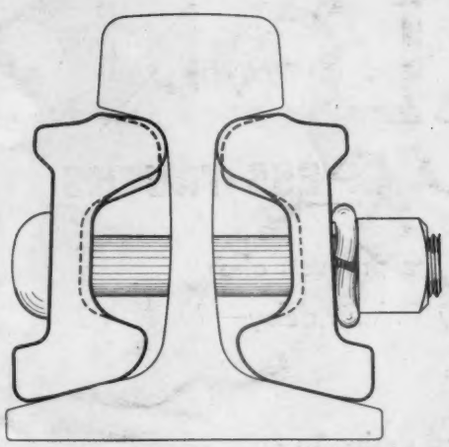
MAR 16 1937

MARCH 13, 1937

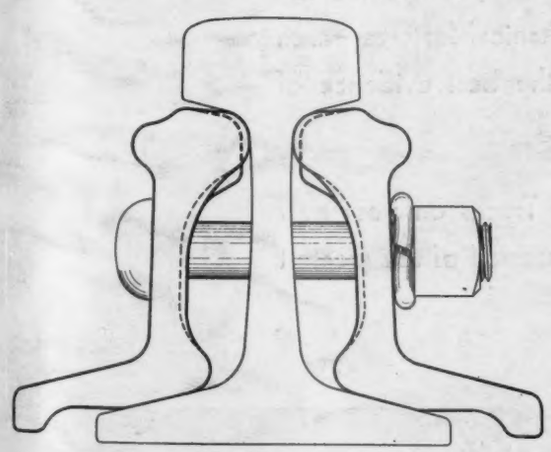
Railway Age

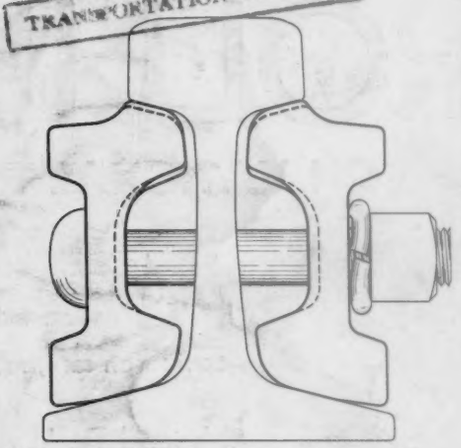
Founded in 1856

CONTROLLED BEARING

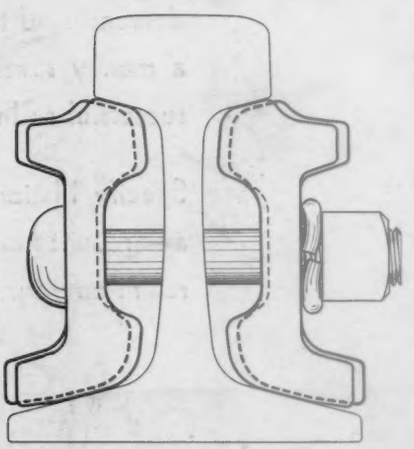


Applied to all
Headfree Designs



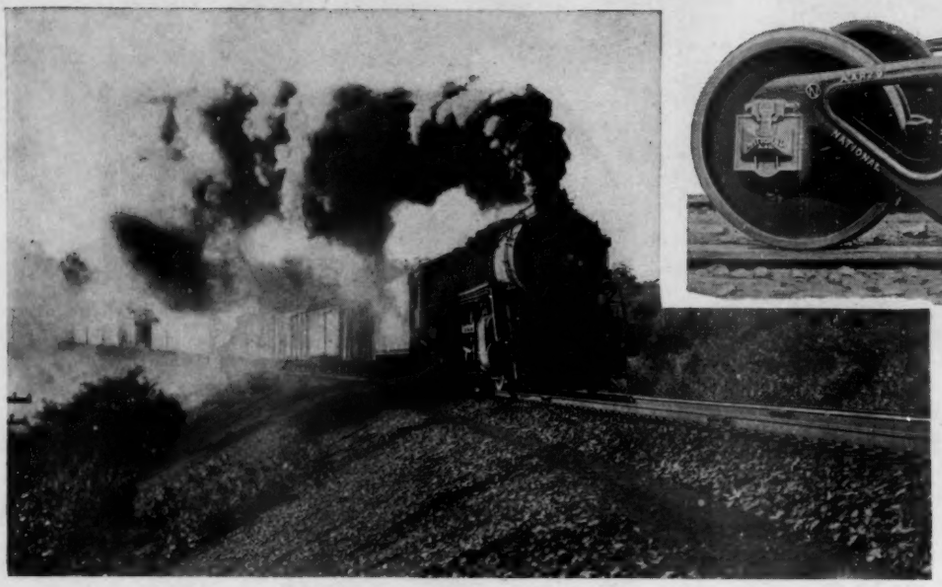


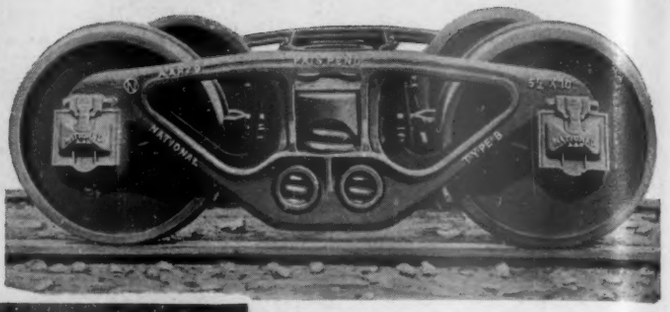
Applied to all
Head Contact Designs



The Rail Joint Company, Inc.

50 Church Street New York, N. Y.





Complies with all
A.A.R. requirements

ROLLING ALONG

ON NATIONAL TYPE B SPRING-PLANKLESS TRUCKS

MODERN fast freight trains transporting the products of a nation must be speeded on their way without delay—carried on safe, reliable and economical trucks.

National Trucks offer a unique and time tested design to cope with this present day speed and increased traffic and assure low operating costs.

A record of over five years of trouble-free performance has demonstrated the value of its inherent mechanical features—each a money saver. Many repeat orders is the best evidence of successful and satisfactory performance.

Specify National Type B Spring-Plankless Trucks on your new and rebuilt freight cars. You will then be assured of the greatest return on your investment.

NATIONAL MALLEABLE AND STEEL CASTINGS CO.
General Offices: CLEVELAND, OHIO
Sales Offices: New York, Philadelphia, Chicago, St. Louis, San Francisco
Works: Cleveland, Chicago, Indianapolis, Sharon, Pa., Melrose Park, Ill.

Canadian Representatives: Railway and Power Engineering Corporation, Ltd., Toronto and Montreal
Published weekly by Simmons-Boardman Publishing Corporation, 1309 Noble Street, Philadelphia, Pa. Entered as second class matter, January 4, 1933, at the Post Office at Philadelphia, Pa., under the Act of March 3, 1879.

Published every Saturday by the Simmons-Boardman Publishing Corporation, 1309 Noble Street Philadelphia, Pa., with editorial and executive offices: 30 Church Street, New York, N. Y., and 105 West Adams Street, Chicago, Ill.

SAMUEL O. DUNN, *Chairman of Board*
HENRY LEE, *President*
LUCIUS B. SHERMAN, *Vice-Pres.*
CECIL R. MILLS, *Vice-Pres.*
ROY V. WRIGHT, *Vice-Pres. and Sec.*
FREDERICK H. THOMPSON, *Vice-Pres.*
ELMER T. HOWSON, *Vice-Pres.*
F. C. KOCH, *Vice-Pres.*
JOHN T. DEMOTT, *Treas.*

CLEVELAND
Terminal Tower

WASHINGTON
1081 National Press Building

SEATTLE
1038 Henry Building

SAN FRANCISCO
111 Sutter Street

LOS ANGELES
Union Bank Building

Editorial Staff

SAMUEL O. DUNN, *Editor*
ROY V. WRIGHT, *Managing Editor*
ELMER T. HOWSON, *Western Editor*

C. B. PECK
W. S. LACHER
ALFRED G. OEHLER
F. W. KRAEGER
E. L. WOODWARD
J. G. LYNE
J. H. DUNN
D. A. STEEL
R. A. DOSTER
H. C. WILCOX
NEAL D. HOWARD
CHARLES LAYNG
GEORGE E. BOYD
WALTER J. TAFT
M. H. DICK
W. J. HARGEST
JOHN H. KING

The Railway Age is a member of the Associated Business Papers (A. B. P.) and of the Audit Bureau of Circulations (A. B. C.).

Subscriptions, including 52 regular weekly issues, payable in advance and postage free; United States and possessions, and Canada, 1 year $6.00, 2 years $10.00; foreign countries, 1 year $8.00, 2 years $14.00.

Single copies, 25 cents each.

Address H. E. McCandless, Circulation Manager, 30 Church Street, New York, N. Y.

Railway Age

With which are incorporated the Railway Review, the Railroad Gazette and the Railway Age-Gazette. Name registered U. S. Patent Office.

Vol. 102 March 13, 1937 No. 11

In This Issue

Southern Pacific Alloy-Steel Passenger Trains . . Page 418

A description of new equipment for the Daylight, built by the Pullman-Standard Car Manufacturing Company, and featuring light-weight, streamline construction.

Santa Fe Reduces Curves on Chicago-Los Angeles Line 430

Tells how this road fixed on 1 deg. 30 min. as the desired maximum and made hundreds of reductions to remove speed restrictions.

Delaware & Hudson Installs Centralized Traffic Control 436

Describes project on 6.6 miles of double track, which includes control of four layouts where interlockings were replaced.

EDITORIALS

Another "O'Fallon Case" in the Making? 415
Fuel Expenditures Show Marked Increase 417
Radio for Emergency Railroad Communication 417

GENERAL ARTICLES

Southern Pacific Alloy-Steel Passenger Trains 418
Freight Car Loading 424
Federal Grade Crossing Program Is in Full Swing 425
Santa Fe Reduces Curves on Chicago-Los Angeles Line 430
Retirement Board Annual Report 435
Delaware & Hudson Installs Centralized Traffic Control 436
Gauntlet Signals on the Bessemer & Lake Erie 439
Railroads Organize for "Perfect Shipping" Month 441
Increased Material Prices Boost Railway Inventories 443
Full Length Movie Portrays C. P. R. History 446
Gary Plant Equipped to Brunorize Rail 447

ODDS AND ENDS 448

COMMUNICATIONS AND BOOKS 449

NEWS 450

REVENUES AND EXPENSES OF RAILWAYS 462

The Railway Age is indexed by the Industrial Arts Index and also by the Engineering Index Service

Unit type construction of "Union" Electro-Pneumatic Car Retarders means that only as much retardation as is necessary need be installed. Fewer parts are used and maintenance costs are minimized. This results in even greater economy than is possible in classification yards equipped with retarders of previous design. » » » » » » » »

Consult our nearest office for details.

1199

1881 **Union Switch & Signal Co.** 1937

SWISSVALE, PA.

NEW YORK MONTREAL CHICAGO ST. LOUIS SAN FRANCISCO

The Week at a Glance

CARLOADINGS: The February 27 total was 697 thousand, which was only 3½ per cent above 1936, but the week in that year did not include the Washington's Birthday holiday as it did this year.

●

CROSSING SUBSIDY: Of the 200 millions of your money and mine which Uncle Sam appropriated to eliminate grade crossings or provide protection, 58 million has been spent on projects already completed and jobs costing 103 millions are under way; and 14 million more will be spent on plans which have been okayed. A survey herein shows what states are getting the money and how much.

●

RADIO AMATEURS: A number of instances of valuable work done by short-wave radio amateurs in providing emergency communication for railways when storms interfere with telegraph and telephone are cited in an editorial herein; and the suggestion is made that a few short-wave sets scattered around a railroad here and there might be a worth-while precaution against emergencies.

●

HEAT-TREATING RAILS: In accord with the spirit of the age, steel rails are getting tougher. A recently developed process of heat treating described herein does the trick. It also makes them fine-grained, reduces internal stresses and favors uniform end-hardening. Considering the punishment rails have to take nowadays, they need all the nursing that modern metallurgy can give them.

●

C. T. C. ON D. & H.: Centralized train control on the busy multiple track line between Albany and Watervliet has replaced 4 interlockings and several hand-thrown switches. The 6.6 miles, active with train and switching movements, as described herein, are all controlled from the dispatcher's office at Albany.

●

INVENTORIES UP: At the end of 1936 the railroads had on hand 319 million dollars worth of materials and supplies —up 10 per cent over the preceding year. An article herein analyzing the inventory situation ascribes the rise to the increased dollar value of materials, to slower deliveries (necessitating larger stocks) and increasing use of materials.

●

REDUCING CURVATURE: Like the ladies who, in springtime, begin to diet to make straight lines of their curves, the Santa Fe has been reducing the curvature on its line between La Junta and Los Angeles; purpose, greater average train speed. Every curve which is the sole cause of a slow-down is on the spot, an article herein discloses. They can't economically remove them all, but any deviation of over 1°30' from tangent has to prove its right to survive.

●

JANUARY EARNINGS: Net railway operating income in the first month of the current year was 38 million—which was only 2 million more than in January, 1936. Gross for the month was 332 million (up 11 per cent over last year). Operating expenses were 254 million (up 9½ per cent). Taxes in January were 28 million (up 32 per cent). Earning on the investment in January was at the annual rate of 2.7 per cent for the roads as a whole—3.7 per cent in the East, 2 per cent in the South and 1.7 per cent in the West.

●

WHEELER PROBE RESTS: The principals in the Wheeler investigation have decided to take a few weeks rest before resuming their keyhole excursion into railway financing. The probers' funds are running low and at least a piece of the $150,000 appropriation now hanging fire before the Senate Audit Committee will be needed to maintain the snooping expedition in the style to which it has become accustomed.

●

GAUNTLET SIGNALS: On a double track line of the B. & L. E. a gauntlet operation over a viaduct has been controlled until recently by train orders—resulting in delays. So, as related herein, an automatic interlocking was installed, with provision, however, for a neighboring operator to cut in manual operation to favor southbound trains (the gradient being against them).

●

APRIL PERFECTION: The regional advisory boards and the loss and damage prevention officers of the railroads are combining to make April a "perfect shipping month." By close attention to improved methods of packing, loading and handling, an effort will be made to determine just how low it is possible to reduce losses to railroads and shippers by imperfect transport.

●

EMPLOYMENT UP: Railway employees in February totaled almost 1,096,000—which was an increase of 2 per cent over January and of 6 per cent over February a year ago.

●

ANOTHER O'FALLON?: The proposed report of the Bureau of Finance of the I.C.C. in the A. T. & N. reorganization would mean throwing out the plan agreed upon by the parties at interest, and the substitution of the Commission's own plan. Such a policy would have far-reaching consequences, rivaling the famous O'Fallon case in the novelty and depth of the issues involved. This case and its implications are outlined in the leading editorial herein.

●

FUEL BILL RISES: The railroads in 1936 spent over a quarter of a billion dollars for fuel—for the first time since 1930. The increase was almost 100 million over the low point reached in 1933. The coal people got most of the money—189 millions—but the slices awarded the oil industry and the power producers were sizeable, too. The aid of these purchases to recovery in the industries which got the business is the subject of one of this issue's editorials.

A.A.R. DIVISIONS MERGE: The operating and transportation divisions of the Association of American Railroads have been consolidated; new name, "Operating-Transportation Division." Chairman is J. Cannon, chief operating officer, Mo. P., and vice-chairman, G. Metzman, manager freight transportation, N. Y. C.

●

FASTER N. Y. TO CHI?: The Pennsy's "Broadway" and the N. Y. Central's "Century" are soon going to be entirely re-equipped with modernistic, light-weight Pullmans. No official announcement of acceleration of the trains has been made —but no confidence is violated in stating that many railroaders believe such a step is being considered.

●

MOP HEARING RECESS: The I.C.C. hearings on Missouri Pacific reorganization were recessed on Wednesday until April 19, after considerable testimony was heard as to traffic prospects of the Texas lines. Commissioner Meyer expressed some misgivings as to the value of traffic forecasts unless market possibilities are studied.

●

19 LOCOMOTIVES: The Northern Pacific this week placed orders (in its own behalf and for the S. P. & S.) for eleven 4-8-4's and six 4-6-6-4's. The National Railways of Mexico are in the market for 10 Pacific's and eight 2-6-6-4's. A large number of new Pullmans is involved in the re-equipping of the "Century" and the "Broadway"—and 80 milk cars, 12 coaches and 150 New York subway cars were added to the unfilled orders of the passenger car builders this week. Freight car orders totaled 1,300. There is as yet no noticeable tightening up in the bargain rates at which equipment loans are available—and all such issues are quickly snapped up by an eager market.

●

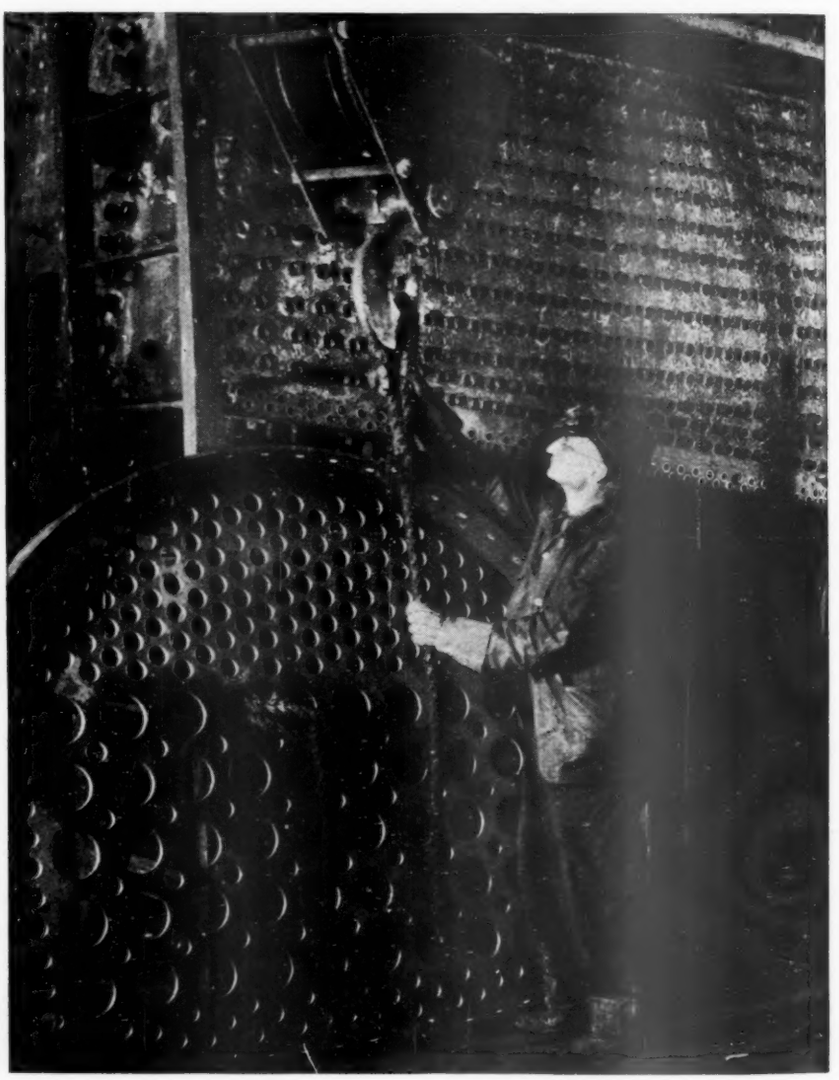
NEW "DAYLIGHTS": Twelve-car trains newly built for the S. P.'s famous "Daylight" runs between San Francisco and Los Angeles are one-third lighter than former standard equipment of equivalent capacity. Cars are wider, lower and the center of gravity has been brought down. With new locomotives built (and painted) to match, Pacific Coast dwellers are given an esthetic treat as well as a boost in travel comfort and service—details in an article with illustrations (profuse is the word for them).

●

C.P.R. MOVIE: There have been many railroad movies—but has there ever been a full-length dramatic feature which had as its background the authentic history of a major railway system? That is a fair characterization of the new cinema drama "Silent Barriers", which tells the story of the building of the C.P.R.'s transcontinental line (along with, of course, the customary love interest and other show business). The picture was produced in England (except for an extensive expedition "on location" in Canada).

The Firebox Gets ... A SURPRISE A SECOND

Hot fire on one side, boiling water on the other, more than 1,000° difference in temperature between the two, 200 pounds per square inch or more trying to escape, and constant vibration all the time the engine works. » » » It's constantly changing stresses all the time—tough service for the firebox sheets. » » » For this service Toncan* Iron is a most economical material. It has an inherent resistance to fire-cracking and pitting. Because of its uniform physical properties it has unusual ability to absorb the "breathing strains" and avoid cracking at staybolt and rivet holes. Its high resistance to chloride and sulphide corrosion makes it particularly advantageous in bad water districts. » » » Toncan Iron is but one of Republic products for railroad service. There is also Agathon* Alloy Steel for forgings; Toncan Iron sheet, plate and pipe for roundhouse and shop; Republic Double Strength Steel for cars and tenders. For any railroad service Republic products assure economical performance. We will gladly send further details. Address Department RA.



Republic Steel Corporation

REPUBLIC STEEL

*Reg. U. S. Pat. Off.

GENERAL OFFICES . . . CLEVELAND, OHIO

ALLOY STEEL DIVISION . MASSILLON, OHIO

RAILWAY AGE

Another "O'Fallon Case" in the Making?

The proposed report of the Bureau of Finance of the Interstate Commerce Commission on the reorganization of the Alabama, Tennessee & Northern has been characterized by one of the ablest authorities on railway finance as "another O'Fallon case"—provided, of course, that the Commission sustains the Bureau in the course it has recommended. That is to say, the proposed report asks for new assumptions of power by the Commission, the validity of which many will be inclined to question, so that—as in the O'Fallon case—there is little likelihood that these powers can be exercised until the courts have reviewed them.

Briefly, the proposed report assumes that, under the law as it now stands, the Commission has the power—

1. To discard entirely a plan of reorganization upon which substantial agreement has been reached by debtors and creditors and to substitute therefor a plan of its own making,
2. To rule against the issuance of income bonds, and require the issuance of preferred stock instead,
3. To make defaulted interest payments on existing bonds an equal claim with principal, and to reduce the claims of equity holders proportionately, and
4. On its own estimate of future earnings, to conclude that the stockholders' equity is valueless and, on that assumption, to deprive them of any participation in the affairs of the reorganized company or of any claim on its future earnings, however great they might be.

It is unlikely that all holders of disinherited and disfranchised issues would accept such a fate lying down; and it is from them that a thoroughgoing legal battle appears most likely to arise, should the Commission follow generally the policy laid down in this case by the Bureau of Finance.

Why Waste Time Negotiating?

From a practical standpoint, the most important question which this proposed report raises is: If the Commission is going to write reorganization plans of its own regardless of agreement by parties at interest on plans presented for its approval, then why should debtors and creditors of the many companies now in the hands of the courts waste their time in the tedious effort to compose their differences? If manna from heaven be available, why toil at the plough? The answer is, of course, that the manna in a drastic reorganization falls only on the holders of underlying bonds; the holders of junior obligations and equity securities are permitted to starve. Probably, therefore, if the Commission sustains this report, the energies which representatives of the "second table" security owners are now using in composing differences with first-mortgage bondholders, will be spent instead in legal efforts to prove the validity of their claim to further existence.

The Debtor's Plan

The Alabama, Tennessee & Northern is a comparatively small railroad, but its affairs involve more complexities than we can set forth in this short discussion. Briefly—and omitting many details, some of them important—the debtor's plan of reorganization is as follows: There would be issued $575,000 of first mortgage, 10-year, 4 per cent bonds, to be sold to the Reconstruction Finance Corporation at par for cash—$275,000 of which would be used to pay an existing loan from the R. F. C. (secured by prior lien bonds and a personal pledge of $110,000 by the trustee, John T. Cochrane) and the balance to pay trustee's notes, taxes, to purchase new rail and equipment and to defray court costs incident to reorganization. Immediately junior to the proposed first mortgage issue would be second mortgage 30-year, 3 per cent income bonds totaling $77,000, to be delivered to the Railroad Credit Corporation in payment for a loan of approximately that amount (secured by a junior lien on collateral held by the R. F. C.).

Having thus met the claims of the two first-aid agencies, the reorganization plan provides for canceling $1,672,860 of outstanding prior lien 6 per cent bonds and exchanging for them an equal amount of new general mortgage 5 per cent series A income bonds. Outstanding general mortgage 6 per cent bonds, totaling $1,959,400, would be canceled and exchanged for new series B 5 per cent income bonds and new no-par common stock on the basis of $500 in income bonds and 5 shares of stock for each existing $1000 of bonds. Holders of existing 6 per cent cumulative preferred stock would get one share of the new common for

each 10 shares of preferred, and present common would be exchanged for the new at 20 shares of the old to one of the new.

The plan would reduce fixed interest charges from $239,546 to $43,590, with a contingent interest liability of $138,790. The company estimates that, with gross revenues at the 1930 level, it can pay fixed and contingent interest and have something left over for stockholders, but the proposed report of the Bureau of Finance belittles this estimate as "unduly optimistic."

Precedence for R.F.C. and R.C.C.

The Manufacturers Trust Company of New York, as trustee for the outstanding prior lien bonds, intervened in the proceeding, raising a question as to the legality of granting a preferred position to the existing loans from the Reconstruction Finance Corporation and the Railroad Credit Corporation. The debtor expressed the belief, however, that assent by holders of two-thirds of the prior lien bonds could be obtained to the treatment accorded the R. F. C. claim (inasmuch as that body proposes to put up the new money needed to consummate the reorganization). The debtor also defends the claim of the R. C. C., in that the money secured from that agency saved it from going into receivership at the time the loan was made.

We pass no judgment, pro or con, on the plan as presented to the Commission—but it at least has in its favor the fact that parties at interest are in substantial agreement upon its provisions. The settlement of civil differences by agreement of the parties at interest has heretofore usually been considered, from a social standpoint, preferable to formal litigation. It may well be that the Federal Bankruptcy Act enjoins upon the Commission the policy recommended by the Bureau of Finance, and that that Act should be amended in the light of the penetrating analysis by Robert T. Swaine, (see *Railway Age*, Aug. 15 and 22, 1936). Be that as it may, the proposed report throws an agreed-upon plan out the window and substitutes a product of the superior wisdom of the Bureau of Finance, in essence as follows:

The Plan of the Bureau of Finance

Instead of the proposed new 10-year first mortgage issue of $575,000, the Bureau of Finance decrees a 20-year issue of $500,000, of which $471,000 is to be sold for cash (to whom, remains a dark secret). The cash is to be used to pay off current liabilities, plus an equipment loan from the federal treasury for which no provision was made in the debtor's plan. The R. F. C. would not get any of this money. Preferred position would be accorded to it for any new advances, but neither the R. F. C. nor the R. C. C. would get anything for loans heretofore made beyond the new securities they would receive in exchange for the collateral they hold.

Immediately subordinate to the prescribed first mortgage, a second mortgage issue ($791,370 of it immediately) is decreed, to be distributed to holders of existing prior lien bonds on the basis of 30 per cent of principal plus interest in default. (Under this arrangement the R. F. C. would get new bonds of a face value of $154,500 as collateral for its loan of $275,000. It would also get some new stock of problematical value. The proposed report suggests that the R. F. C. avoid holding the bag by cashing in on the personal guaranty of $110,000 of the debt by Mr. Cochrane).

In addition to being paid off at 30 cents on the dollar in new bonds for principal and interest on the outstanding prior lien issue, holders would, for each $1000 of bonds and accumulated interest, also receive 4 shares of new 5 per cent non-cumulative preferred stock and 3 shares of new no-par common. Holders of outstanding general mortgage bonds would, for each $1000 of principal and defaulted interest, receive 2 shares of the new 5 per cent non-cumulative preferred and 4 shares of no-par common. The Railroad Credit Corporation would be treated as an unsecured creditor, and would get only 755 shares of new common stock to cover its claim of $75,481. Present preferred and common stockholders would be wiped out completely.

The capital structure of the reorganized company as proposed by the Bureau of Finance compares with that submitted by the debtor as follows (some details omitted):

Bureau of Finance Plan	*Debtor's Plan*
$471,500 first mortgage 4%, 20-yr. bonds*	$575,000 first mortgage 4%, 10-yr. bonds*
$791,370 second mortgage 4%, 30-yr. bonds	$77,000 second mortgage 3%, 30-yr. income bonds
$1,667,100 non-cum. pfd. 5% stock	$1,749,900 series A 5%, 30-yr. income bonds
20,907 shares no-par common stock	$979,700 series B 5%, 30-yr. income bonds
	12,510 shares no-par common stock
	$151,500 equipment loan from U. S. treasury†

* Sinking fund 2% per annum.

† Present status unchanged.

It is to be noted that, while the plan of the Bureau of Finance is much more drastic in its treatment of junior security holders than the debtor's plan, nevertheless fixed interest charges under the latter are less than those decreed in the proposed report. While the Bureau of Finance frowns on income bonds, among other reasons because it believes that a claimant of this degree should share in the management of the property, it is to be noted that, under the debtor's plan, control of the property likewise passes to creditors.

Huge Equity Interests at Stake

Without mentioning any names, a little reflection as to the affairs of some of the large railroads in the hands

of the courts will disclose some interesting major shifts in railroad control in prospect—provided, of course, that the Commission sustains the Bureau of Finance and that the courts sustain the Commission. In such an event, some large institutional investors may awake to find themselves, willy nilly, in the railroad business. If they don't like that, or the law won't let them take part in such affairs, they can always unload their holdings and take their losses.

The zeal of the regulators which, on its face, would appear to give senior creditors more than they demand, is thus no guarantee of that outcome as a practical result. It is just barely possible that conflicting interests able to compose their differences might come nearer to a workable arrangement than that which a superior authority could impose upon them. But we desist from pursuing further this line of thought, since our purpose is not to prejudge the case but only to help to bring the discussion of it into the open. In it are involved fundamental questions of property rights in railroads, as well as of the social desirability of curtailment of such rights by regulatory authority. If the Commission follows the recommendations of the Bureau of Finance in this case, then the best minds available will be none too adequate to resolve the issues which will inevitably arise.

Fuel Expenditures Show Marked Increase

The cost to the railroads of the fuel and power charged to train and yard service last year exceeded a quarter of a billion dollars for the first time since 1930. The 1936 total—$253,000,000—topped the 1935 figure by some $50,000,000, and represented an increase of almost $100,000,000 above the low point reached in 1933.

The principal item in total locomotive fuel charges in 1936 was $188,572,000 for coal, followed in order by $48,486,000 for fuel oil, $13,352,000 for electric current, $1,911,000 for gasoline, $316,000 for Diesel fuel, and $184,000 for all other fuel. These cost figures covered 80,439,000 tons of coal, 2,336,000,000 gallons of fuel oil, 1,570,000,000 kilowatt-hours of electric current, 24,767,000 gallons of gasoline, 6,898,000 gallons of Diesel fuel, and other fuel equivalent to 60,000 tons of coal.

Placing all types of fuel upon a coal basis, railroad locomotive fuel consumption last year was equivalent to 97,732,000 tons of coal, of which 63 per cent was used in freight service, 22 per cent in passenger service, and 15 per cent in yard switching service. This 97,732,000 tons of coal (or its equivalent) represented an average daily consumption by the railways of 267,030 tons, or an average of 11,125 tons of coal every hour, day and night, for the entire year. The increase, previously mentioned, of $50,000,000 in railroad locomotive fuel charges in 1936 over 1935 is another illustration of the importance to national recovery of restoration of railroad purchasing power.

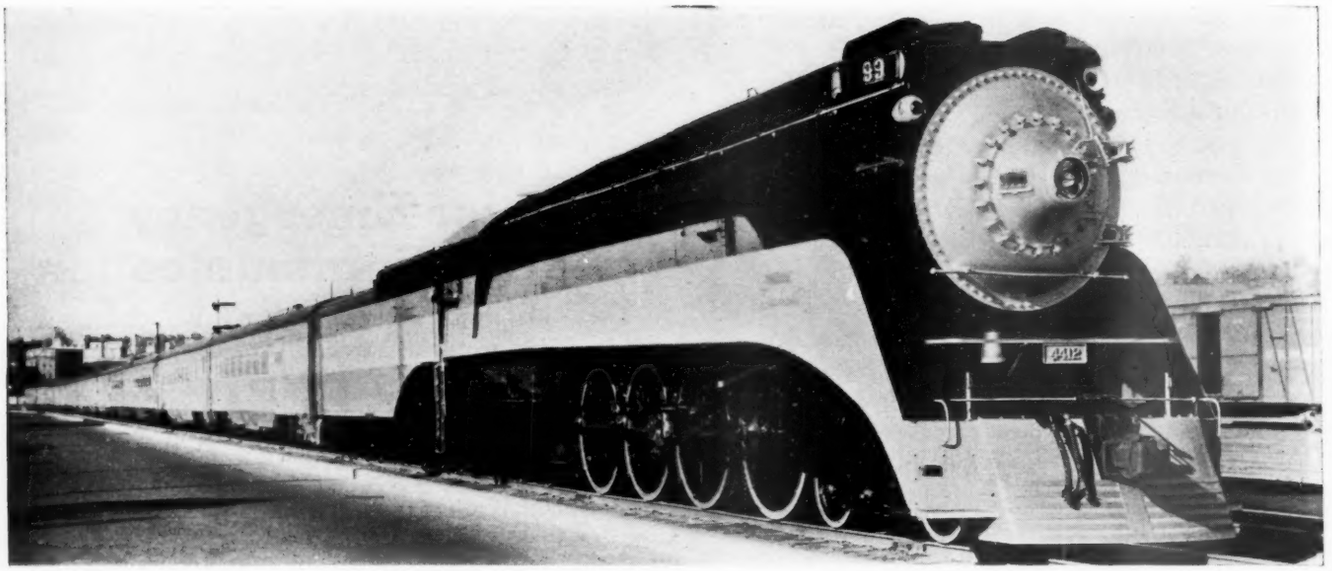
Radio for Emergency Railroad Communication

The widespread sleet storms and the disastrous floods which wrought havoc to extended sections of railway communication pole line circuits during January, again direct attention to the practicability of using short-wave radio equipment, similar to that adopted extensively by amateur stations, for emergency railroad communication. Approximately 45,000 amateur stations throughout the United States and Canada are represented by membership in the American Amateur Radio League. At the convention of the Telegraph & Telephone Section, A.A.R., last fall, it was suggested that each railway compile information regarding the location and equipment of each of the amateur stations along its lines, in order that it might be prepared to call upon them for emergency service.

An excellent example of the possibilities of such service was that rendered by amateurs during and following the hurricane in Florida in September, 1935, when extended sections of pole line on the Florida East Coast were destroyed. In another instance, two amateur stations were used by the Canadian Pacific for several days to handle messages and direct train operations when a storm destroyed a section of its pole line near Montreal, Que. In still another instance, when the communication lines between Edmonton, Alta., and Vancouver, B. C., were out of service for 10 days, amateur stations were used to transmit important messages, the results being especially satisfactory between Kamloops, B. C., and Vancouver.

During the recent floods in the Ohio river valley, many of the amateur radio stations were put out of service by the flooding of the generating plants from which they derived their power. Yet one radio station was able to operate and render commendable public service in one flooded city by using power from a portable gasoline-engine driven generator.

These instances suggest that some railroads might well investigate the practicability of providing short-wave radio sets at certain of their important offices, and also secure one or more portable sets with gasoline-engine driven generators for emergency use, independent of commercial a-c. In many locations, the railroads already have emergency or portable independent power units available, and it would only be necessary to provide the radio sending and receiving apparatus. In some cases, a railroad would need only to make arrangements with amateur radio operators, many of whom are in railroad service. Preparedness being the objective, it includes a definite plan of action, with provision for operators, sets, and assured power supply.



One of the Southern Pacific "Daylight" Streamliners at Los Angeles, Calif.

Southern Pacific Alloy-Steel Passenger Trains

Two 12-car trains for the Daylight, built by Pullman-Standard are featured by light-weight streamline construction

TWO new 12-car trains, recently designed and built for the Southern Pacific by the Pullman-Standard Car Manufacturing Company, Chicago, comprise complete new car equipment* for the well-known "Daylight" trains which the Southern Pacific operates between San Francisco, Calif., and Los Angeles. The consist of each of the trains is identical, as given in one of the tables, and includes one combination baggage-coach, seating 44; one full coach, seating 48; six coaches, articulated in units of two, seating 50 passengers per body; a tavern car, seating 42; a diner, seating 40; a parlor car, seating 33; and a parlor-observation car, seating 41; or a total seating capacity of 548. The 12 cars have a coupled length of slightly over 870 ft. and a light weight of 1,144,340 lb., or fully one-third less than conventional riveted steel cars. The weight of each train, including the locomotive, ready for service, is 2,028,551 lb.; and each train cost about $1,000,000.

The cars are of conventional width outside, but 5¼ in. wider than usual inside. The total car height has been reduced 6 in. and the center of gravity lowered about 9½ in. The car bodies are made of Cor-Ten steel, with Pullman welded truss-type side frames and stainless steel exterior sheets finished in an attractive wide orange, red and black stripe color scheme. The underframes are of the welded type throughout, with castings confined for structural utility to the assembly of bolsters and buffers. The center sills are of the inverted U-type, extending the full length of the cars, with a spread effect at the ends, terminating at diaphragm posts. All floor supports and side sills are pressed Z-members of nominally light gage metal bound crosswise of the car, with uniformly spaced sheet steel pressed members, all welded together. Below the side sill, a semi-elliptic apron sheet is secured, effectively obscuring the underneath equipment.

The truss-type side framing is constructed of vertical and diagonal pressed-steel members, principally channel shaped, all securely welded into a unit. Side sheathing is of stainless steel corrugated, except for the window stretch which is flat.

The ends of the cars are pressed-steel members, with center and outer diaphragms to close the openings between the car bodies. The roofs are oval in shape, constructed of U-type carlines, with several pressed Z-shaped purlines and flat roof sheets, all made of light-gage alloy steel, fabricated by spot-welding, and thus affording a light but rigid roof structure.

The flooring, except for the conventional wood floor in the baggage room, is composed of a specially-pressed aluminum sheet, with top depressions filled with cork strips, above which is applied cork-board insulation, and on top of the latter another layer of heavy-density cork, covered with either linoleum or carpet. In the kitchens and pantry, the cork is covered with stainless

* New streamline steam locomotives, built by the Lima Locomotive Works, Inc., and designed to haul these trains in modern high-speed service, were described in the *Railway Age* of February 20, page 319.

steel. The superstructure is thoroughly insulated with Dry Zero insulation 2 in. thick.

Titelock Type-E head couplers are used at all ends not having the articulated feature, except the rear-end observation car which is equipped with a light-weight A. A. R. coupler. Waughmat rubber draft gears are installed. Passenger entrances are at one end, only, of each coach and the parlor car, with steps of folding type operating in conjunction with trap doors and invisible when the vestibule doors are in closed position.

Three cars of two articulated bodies each are provided, one body classified for women and the other for men. The other cars are each equipped with two trucks. All trucks are four-wheel, of the triple-bolster type. The Simplex unit-cylinder clasp brakes have double brake heads with four shoes per wheel and four brake cylinders per truck. Truck frames and journal boxes are cast steel of special design. The 10-kw. generators have truck-hung drive, except in the case of the tavern and dining cars which have 15-kw. body-hung generators. Axle journals are A. A. R. standard 5½ in. by 10 in. and 6 in. by 11 in., to suit varying weights of cars. Journal lubrication is of the self-contained wick type, developed on this railroad.

All sash are double in one part, with the outer in fixed position, while the inner sash can be swung inward and upward for cleaning purposes. The sash are formed of aluminum extrusions and provided with rounded corners, all glass being set with a patented rubber molding. The main sash in all of the passenger compartments are of extraordinary width, being 5 ft. 4 in. between posts. These, with relatively narrow piers, provide maximum vision for the passengers. Safety glass is applied in inside sash, while ¼-in. polished plate glass is applied in outer sash.

Consist of the New Daylight 12-Car Trains of the Southern Pacific

No. of cars in each train		Length overall per car	Light weight per car	Seating capacity per car
1	Coach, baggage	79 ft. 2 in.	102,500 lb.	44
1	Coach for women and men.	79 ft. 2 in.	101,980 lb.	48
3	Coaches for women only*..	66 ft. 1 in.	86,260 lb.	50
3	Coaches for men only*....	66 ft. 1 in.	84,206 lb.	50
1	Tavern car	79 ft. 2 in.	113,820 lb.	42
1	Diner	79 ft. 2 in.	112,680 lb.	40
1	Parlor car	79 ft. 2 in.	102,620 lb.	33
1	Parlor-observation car	78 ft. 1½ in.	99,340 lb.	41
Total train car length				870 ft. 5½ in.
Total train car weight				1,144,340 lb.
Total seating capacity				548

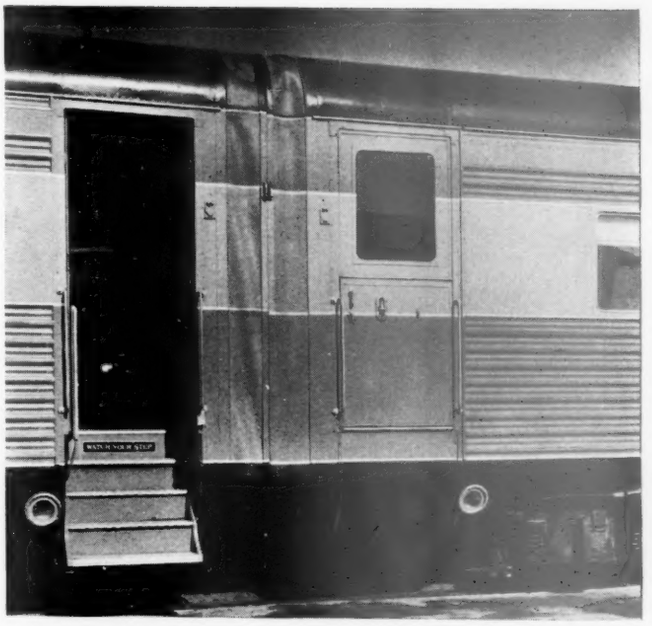
* Each men's and women's coach is articulated at one end, the two cars forming a unit. The weight given is the average for the three cars.

For the interior, tempered Presdwood is used principally for the side-wall linings and headlinings of all passenger compartments. For partitions and doors, aluminum-covered plywood is used, securely bound to the car structure with ornamental moldings of aluminum in extruded and pressed designs. The kitchen and pantry in the dining car and the kitchen and coffee shop of the tavern car are finished, in addition, with a liberal amount of stainless steel at all refrigerators, sinks, ranges, soda fountain and similar appurtenances.

The last car in the train has an oval end, affording splendid rear-end vision. This car has a back-up light on the rear roof and a flush tail sign having the insignia of the train. Provisions are made in this car to permit connection with local telephones.

The tavern car is equipped with a quarter-circle bar, with cocktail sections providing accommodations for 18 persons, while at the opposite end is a coffee shop with high pedestal stools accommodating 24.

All cars are fully air conditioned, using the Safety steam-jet system, with the outlets for the cooled air concealed behind the indirect lighting along the center lines of the cars. Heating is thermostatically controlled, the overhead heat operating in conjunction with cooling units through the cooling ducts and outlets.

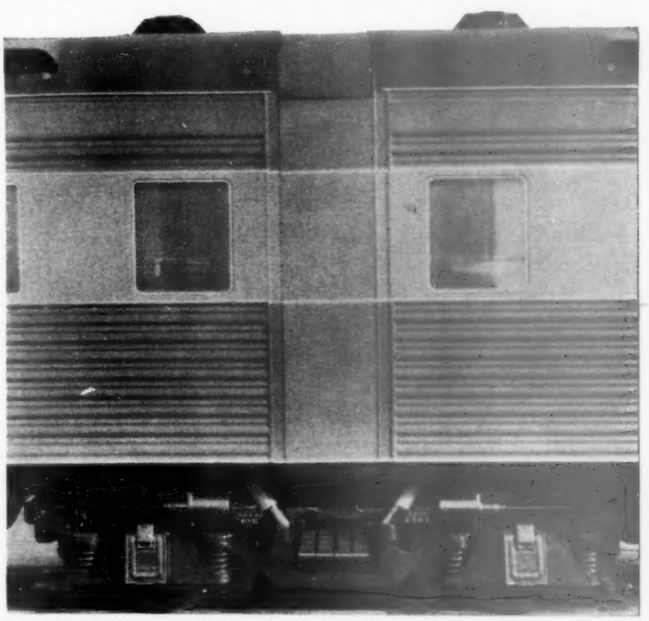


Non-Articulated Car Connection with Spot-Lighted Vestibule Steps, Open and Closed

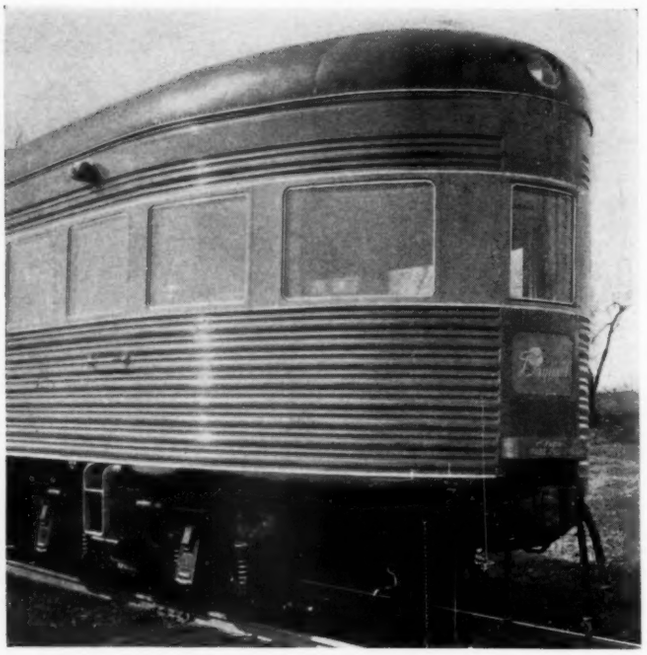
The trains are fitted with high-speed brake equipment with speed-governor control which functions, in predetermined speed steps, to hold the retardation effect of the brake shoes as nearly uniform as practicable. The brake includes electro-pneumatic attachments but is also designed to work in harmony with the conventional air brakes.

Modern toilet accommodations are furnished throughout the train, hot and cold water being raised by air pressure from tanks underneath the cars. All drinking water is indirectly ice-cooled and purified by passing through Everpure filters.

To serve the 12 cars, four radio receiving sets are employed. They are distributed throughout the train



Articulated Connection at One of the Intermediate Trucks



The Rear End of the Train

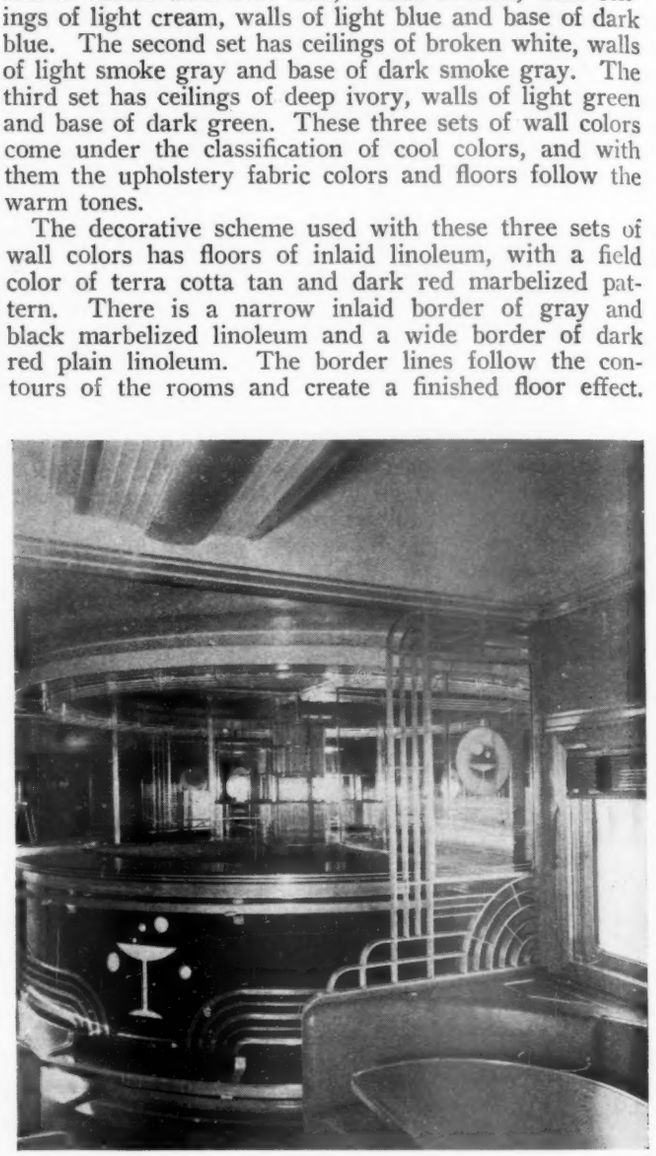
and trainlined to serve loud speakers in all cars except the diner. Each receiving set is furnished with 110-volt a.c. power through a converter unit, driven from the 32-volt d.c. power system of the car. Each loud speaker has individual volume control. All electric motors throughout the train have radio interference filters.

Interior Decorative Treatment and Equipment

The general interior color schemes and detail designs were developed by the Pullman-Standard Car Manufacturing Co., in conjunction with representatives of the Southern Pacific. All cars are treated in six basic sets of interior paint colors; and with these six sets of colors, two sets of interior finishings are used. In the coaches, one decorative scheme of fabrics is used with three sets of wall colors, and the other decorative scheme is used with the remaining three sets of wall colors. The sets of colors used are: first, a blue scheme, with ceilings of light cream, walls of light blue and base of dark blue. The second set has ceilings of broken white, walls of light smoke gray and base of dark smoke gray. The third set has ceilings of deep ivory, walls of light green and base of dark green. These three sets of wall colors come under the classification of cool colors, and with them the upholstery fabric colors and floors follow the warm tones.

The decorative scheme used with these three sets of wall colors has floors of inlaid linoleum, with a field color of terra cotta tan and dark red marbelized pattern. There is a narrow inlaid border of gray and black marbelized linoleum and a wide border of dark red plain linoleum. The border lines follow the contours of the rooms and create a finished floor effect.

Rotating, Reclining-Type Seats in One of the Coaches



The Spectacular Bar and One of the Semi-Circular Settees and Tables in the Tavern Car

A simple aisle strip design is used, utilizing the same border effects.

The seat coverings are of curly mohair in golden brown and green, with a wavy line design. The window shades have a horizontal line pattern, with colors to match the interior decorative treatment. Headrest covers are a light tan and green Colonial cloth material, with the Daylight insignia stamped thereon. Circular tinted mirrors in satin-finish aluminum frames are placed at the bulkheads in each of the coaches.

The second division of colors for the coaches is of three sets of colors in warm tone; namely, ceilings of ivory with walls of two shades of tan; ceilings of ivory with walls of light and dark apricot; ceilings of ivory white, with walls of two shades of yellow. The floor covering is a green and tan marbelized linoleum, with distinctive border lines which follow the contours of the room and also form the aisle strip design.

The ladies' lounge rooms are so arranged that they are always in contrasting colors to the colors used in

the main coach compartments. For example, if the main coach compartment is in tan, the ladies' lounge room is done in gray and a common set of fabrics is used. The chairs in all the ladies' lounge rooms are satin-finish, aluminum-frame type, with two chairs upholstered in a golden brown check pattern and two chairs and a dressing chair upholstered in a rust-tint checked pattern. The floors are of inlaid linoleum to harmonize with the seat coverings, and portieres are in a henna material.

Novel Architectural Treatment Provided

The men's smoking rooms are also arranged so that they are in contrasting colors from the main coach compartment. For example, if the main coach compartment is in gray, the smoking rooms are done in tan, with chairs of satin-finish aluminum frames. Two chairs are upholstered in tan leather and the sofas are upholstered in green leather. The floor coverings are

The Horseshoe Lunch Counter in the Coffee-Shop Section of the Tavern Car

inlaid linoleum in colors of green, tan and yellow, with borders of plain dark green. The portiere material for the men's room is a jade green mohair fabric.

One of the outstanding features of the coaches is the use of unusually wide 5-ft. 4-in. windows, giving a maximum visibility and creating a definite horizontal line effect to the coach interiors. This effect is heightened by the use of satin-finish aluminum moldings running the full length of the car above and below the windows and the complete framing of each window by satin-finish moldings. The pier panels are a horizontal fluted section, giving an interesting effect of light and shadow and accent the horizontal line established by the window and trim moldings.

An entirely new type of built-in parcel rack has been designed for these trains which gives an effect of being part of the car structure rather than an applied type of rack. The parcel rack is painted to match the walls and has Spot-Ray lights placed over the center of each coach seat to provide direct illumination. The lower portion of the rack is constructed with satin-finish louvres

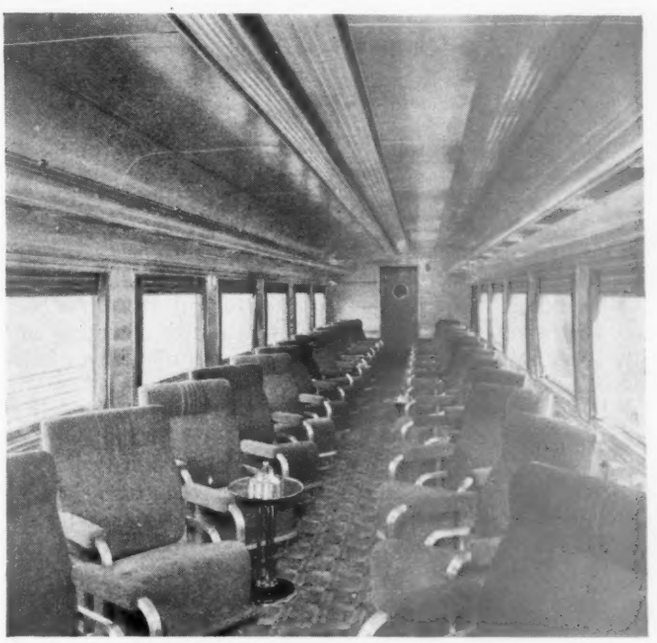
The Dining Car

running the length of the car, so that parcels and packages, when placed in the rack, will be visible.

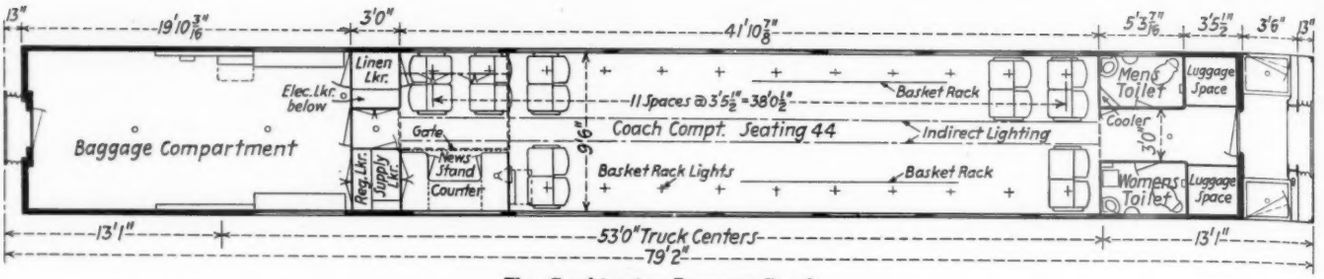
Secondary ceiling lighting is employed to give general ceiling illumination and to serve as an outlet grille for the air-conditioning system. The lower portion of this ceiling lighting structure is opened up so that light is reflected on the lower surface of the air duct, eliminating the dark shadow of the air duct. The coach seats are all of a new design, using stainless-steel tubing in bright chrome finish, with open arms, giving a very light and modern-appearing seat. The coach seats have sponge rubber seats and backs and are extremely comfortable. Ash trays are recessed into the wall at each coach seat for the convenience of the passengers.

Special Features of the Tavern Car

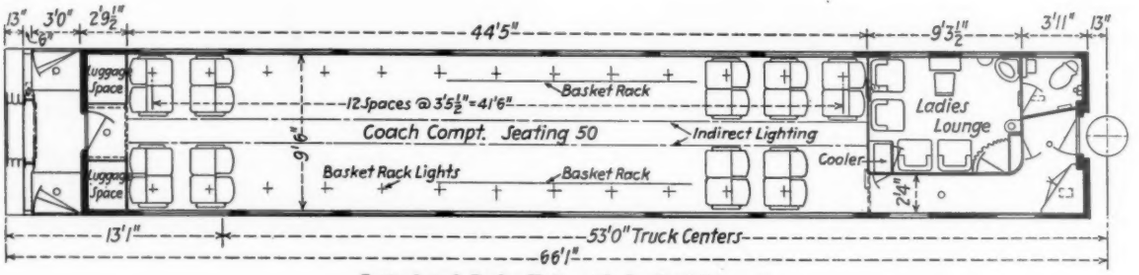
The architectural treatment of the windows and moldings in the tavern car is of the same general type as



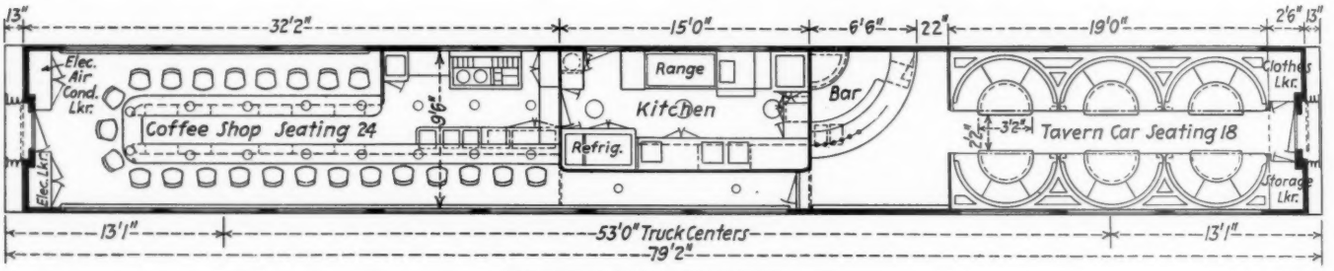
In the Parlor Car



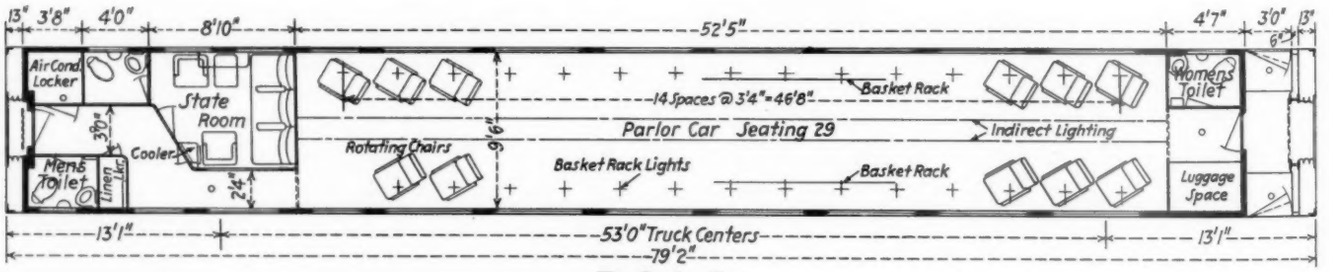
The Combination Baggage-Coach



Articulated Body Unit with Ladies' Lounge



The Coffee Shop and Tavern Car



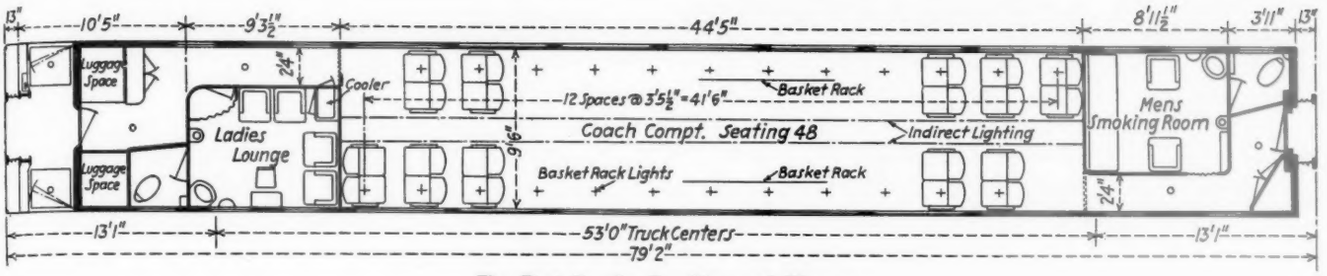
The Parlor Car

already described for the coach, but the ceiling in the tavern section is designed for indirect light, and in the coffee shop for Spot-Ray light. The lighting effect obtained in the tavern car is both unusual and pleasing. Spectrum lighting is used for the tavern section; that is, by means of color control, the ceiling lights change color, going from yellow to blue, to red and then back to yellow again. The color is constantly changing and the blending of colors, when going from one major color into another, gives a very interesting effect.

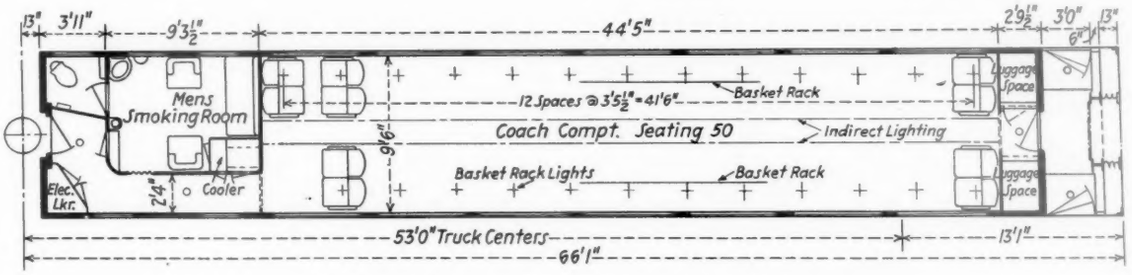
The lighting at the quarter-circular line of the bar is of the marquee type, following the line of the bar and having edge-lighted glass reflecting into polished metal mirrors on either side. The light at the bar is a constant amber light. The back bar has illuminated glass tubing, with the glasses placed on shelves in front and so arranged that the glassware and shelves form a pyramid design. Mirrors are used on either side of the bar and the reflection of the bar and back bar in the mirrors gives the effect of a complete circular bar.

The bar, itself, has been made the feature part of the room. The base of the bar is in black Formica, while the front is in dark blue Formica with inlaid satin-aluminum lines on either side of an illuminated champagne glass and bubbles. The foot and hand rails are especially designed to harmonize with the bar and are left in satin-finish aluminum.

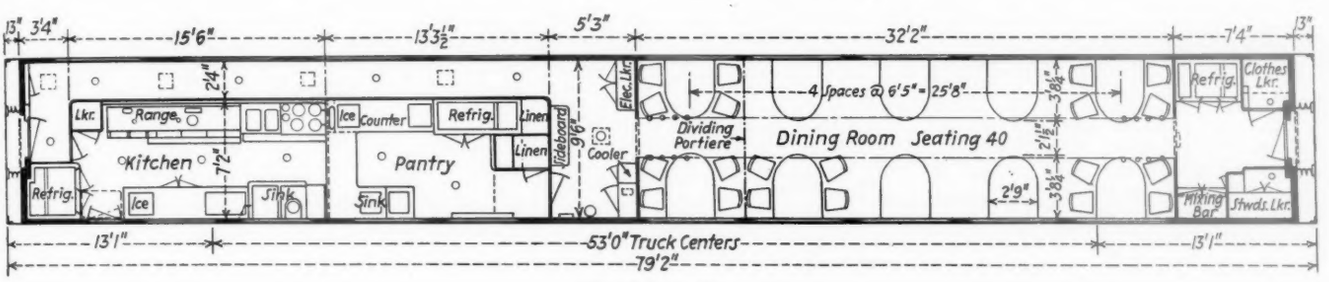
The bar is separated from the cocktail lounge by ornamental aluminum grilles on either side of the room. In each grille is a glass panel sandblasted in a modern design of bubbles and a champagne glass. The cocktail lounge has built-in semicircular seats placed on either side of the car and are upholstered in light brown leather. The cocktail tables are also semi-circular in design and have brick red Pnue-Tile tops. Satin-finish aluminum moldings are placed on the upright pedestal sections and give an interesting trim effect. Draperies, placed at each window, are of diagonal-weave fabric in shades of deep coral. The floor covering of this section is a pebble-weave carpet of dark raisin color. Venetian



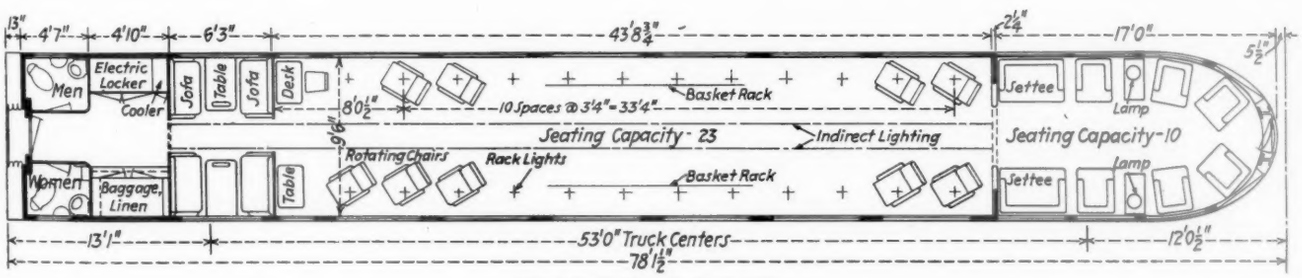
The First Coach—For Men and Women



Articulated Body Unit with Men's Smoking Room



The Dining Car



The Parlor-Observation Car

blinds are used and are of the satin-finish aluminum type, with the tape in deep coral to match the draperies. This section of the car has a cream ceiling, light blue wall and dark blue base.

The other portion of the tavern car, fitted as a coffee shop, has the same color treatment as the tavern end. The top of the lunch counter is covered in a gray Pneu-Tile and the floor covering is linoleum of a red and tan marbelized design, with wide borders of plain dark red linoleum and a narrow border of gray and black. The coffee shop stools have satin-finish aluminum frames and are upholstered in an orange-red leather. The ceiling construction in this section of the car is flat, with Spot-Ray lights so placed as to follow the lines of the lunch counter. Satin-finish aluminum moldings are provided on either side of the lights. The window shades have a horizontal line pattern in graduated shades of coral, tan and orange on a golden tan background.

The same type of architectural treatment has been carried out in the dining cars, with the same type of window frames, pier-panel sections and horizontal moldings. The ceiling in the main room is arranged for indirect ceiling light. The ceiling is of deep ivory, the walls of light green and the base of dark green. The carpet is of a special design, dark green in color, with the design motif worked out in shades of coral, yellow and rose. The dining chairs have satin-finish aluminum frames and are upholstered in a two-tone texture fabric of rust color. The window shades are a horizontal line stripe, with graduated shades of coral and orange on a tan background. Draperies, applied to each window, are deep coral in shade. The china, silver and linens were all designed especially for this train and repeat the colors used in the general color scheme. At the kitchen end of the car, a buffet, modern in design and finished in light walnut with satin-finished aluminum trimmings, is placed. A small mixing bar is provided at the head end of the diner for the use of the steward

in the preparation of drinks to be served in the diner.

The parlor and parlor-observation cars are finished in two sets of wall colors, with one set of fabric colors common to each of the two wall-color schemes. One car has ceilings of ivory white and walls of two shades of yellow, while the other car has ceilings of ivory, walls of light and base of dark apricot. The carpet is a block design on a green background, with color lines of brown, jade green, coral and rust forming the pattern. Three colors of seat coverings are used, with the dominating color in jade green, while the other fabrics are in chamois and rust for color accents. The parlor-car chairs are of a revolving type, especially designed for this train, and have satin-finish aluminum frames with sponge rubber seats and backs.

The stateroom in the parlor car has a ceiling of cream, walls of light and base of dark blue. The floor covering is a raisin-color pebble-weave carpet, and the seat coverings are in blue and rust. Chairs have satin-finish aluminum frames and the table is walnut. The window shades and draperies in the stateroom are of the same design and color as used in the car body. The furnishings in the parlor-observation car are the same as already described for the parlor car, with the exception that the observation room has movable furniture. The chairs and settees in the observation room have satin-finish aluminum frames and are upholstered in the green, rust and chamois materials used in the parlor-car section. The magazine table, magazine racks and writing desk are of light walnut and the magazine-rack lamps are of satin-finish aluminum with shades of the same material.

Partial List of Equipment and Materials on the Daylight Trains of the Southern Pacific

Builder	Pullman-Standard Car Mfg. Co., Chicago
Alloy steel	Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
Aluminum extrusion and sheets	Aluminum Co. of America, Pittsburgh, Pa.
Steel castings	Universal Draft Gear Attachment Co., Chicago
Cast-steel truck frames	General Steel Castings Corp., Eddystone, Pa.
Wheels	Standard Steel Works Co., Burnham, Pa.
Axles	Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
Alloy-steel truck springs	American Locomotive Company, Railway Steel Spring Division, New York
Journal boxes and lids	Symington Gould Corp., Rochester, N. Y.
Satco-lined journal bearings and lubricator	Magnus Metal Corporation, Chicago
Air-brake specialties	Westinghouse Air Brake Co., Wilmerding, Pa.
Brake shoes	American Brake Shoe & Foundry Co., New York
Clasp brakes	American Steel Foundries, Chicago
Hand-brake handles	Dayton Mfg. Co., Dayton, Ohio
Couplers, Type E Tite-lock	National Malleable & Steel Castings Co., Cleveland, Ohio
Draft-gear rubber mats	Waugh Equipment Co., New York
Insulation, Dry Zero	Johns-Manville Sales Corp., New York
Batteries	Edison Storage Battery Div., Thomas A. Edison, Inc., West Orange, N. J.
Axle generator	Safety Car Heating & Lighting Co., New York
Axle-generator drive, truck-hung	D. L. Jennings & Co., Chicago
Air-conditioning equipment	Safety Car Heating & Lighting Co., New York
Steam-heat specialties	Vapor Car Heating Co., Inc., Chicago
Conduit, thin wall	Steel & Tubes, Inc., Cleveland, Ohio
Bracket lighting fixtures	Pullman-Standard Car Mfg. Co., Chicago
Spectrum lighting in tavern car	Ward Leonard Electric Co., Mt. Vernon, N. Y.
Special lighting fixtures	Luminator Company, Chicago
Center lighting in coaches	Adams & Westlake Co., Elkhart, Ind.
Marquee lighting over bar in tavern car	Safety Car Heating & Lighting Co., New York
Radio receivers and speakers	RCA Mfg. Co., Inc., Camden, N. J.
Tail lights, step lights and marker receptacles	Pyle-National Co., Chicago
Window glass	Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Window-shade material	Pantasote Company, Inc., New York
Window-shade fixtures	Adams & Westlake Co., Elkhart, Ind.
Venetian blinds, tavern car	H. B. Dodge & Co., Chicago
Cork for floors	Armstrong Cork Products Co., Lancaster, Pa.
Linoleum	Armstrong Cork Products Co., Lancaster, Pa. W. & J. Sloane, New York
Carpet	Chas P. Cochrane, Philadelphia, Pa.
Twin seats in coaches	Heywood-Wakefield Co., Gardner, Mass.
Revolving chairs in parlor cars; coffee-shop stools	General Fireproofing Co., Youngstown, Ohio
Seat and chair coverings	Blanchard Bros. & Lane, Newark, N. J. L. C. Chase & Co., Inc., New York Collins & Aikman Corp., Philadelphia, Pa.
Rubber cushions (Dunlopillo)	Dunlop Tire & Rubber Company, Buffalo, N. Y.
Pneu-tile — dining tables and coffee-shop counter	Midgeley & Borrowdale, Chicago
Formica—tables and bar	Formica Insulation Co., Inc., Cincinnati, Ohio
Stainless steel linings	Allegheny Steel Co., Breckenridge, Pa.
Filters, Everpure	Tested Appliance Co., Chicago
Soda fountain and bar in tavern	Bastian-Blessing Co., Chicago
Ash receptacles in side walls	Adams & Westlake Co., Elkhart, Ind.
Luggage racks	Pullman-Standard Car Mfg. Co., Chicago
Washstands and fixtures	Crane Co., Chicago
Copper tubing and fittings	Chase Brass & Copper Co., Inc., Waterbury, Conn.
Hoppers, foot-operated	Duner Co., Chicago
Paper towel cabinets	Scott Paper Co., Chester, Pa.
Paints, exterior	E. I. duPont de Nemours & Co., Wilmington, Del.
Paints, interior	Sherwin-Williams Co., Cleveland, Ohio

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading for the week ended February 27 totaled 696,727 cars, a decrease of 18,157 cars or 2.5 per cent below the preceding week due to Washington's birthday holiday, an increase of 23,858 cars or 3.5 per cent above the corresponding week in 1936 and an increase of 92,396 cars or 15.3 per cent above the corresponding week in 1935. The corresponding weeks in 1936 and 1935, however, do not include a holiday. All commodities except coal showed decreases under the preceding week, while all commodities except coal and grain showed increases over last year. The summary, as compiled by the Car Service Division, Association of American Railroads, follows:

Revenue Freight Car Loading

For Week Ended Saturday, February 27

Districts	1937	1936	1935
Eastern	155,249	150,329	140,480
Allegheny	147,316	132,815	119,238
Pocahontas	56,092	53,149	45,460
Southern	110,552	101,601	94,756
Northwestern	72,895	79,653	68,676
Central Western	99,090	97,450	86,524
Southwestern	55,533	57,872	49,197
Total Western Districts	227,518	234,975	204,397
Total All Roads	696,727	672,869	604,331
Commodities			
Grain and Grain Products	27,772	36,657	29,125
Live Stock	11,003	10,573	12,731
Coal	159,144	175,153	138,849
Coke	11,989	10,313	8,236
Forest Products	34,679	29,866	26,010
Ore	10,683	5,873	4,191
Merchandise L.C.L.	153,131	157,751	159,708
Miscellaneous	288,326	246,683	225,481
February 27	696,727	672,869	604,331
February 20	714,884	586,487	553,165
February 13	691,618	631,095	581,669
February 6	675,026	621,686	591,327
January 30	659,790	621,890	596,961
Cumulative Total, 9 Weeks	6,095,141	5,486,690	5,096,599

Car Loading in Canada

Car loadings in Canada for the week ended February 27 totaled 46,646, as against 46,689 for the previous week and 43,566 for the corresponding week last year, according to the compilation of the Dominion Bureau of Statistics.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada:		
February 27, 1937	46,646	28,716
February 20, 1937	46,689	28,137
February 13, 1937	46,370	27,051
February 22, 1936	43,566	22,187
Cumulative totals for Canada:		
February 27, 1937	371,219	217,852
February 22, 1936	321,654	174,868
February 23, 1935	339,117	176,871

Approved Crossing Protection Signals, and Project on the C. & O. at Clifton Forge, Va.*

Federal Grade Crossing Program Is in Full Swing

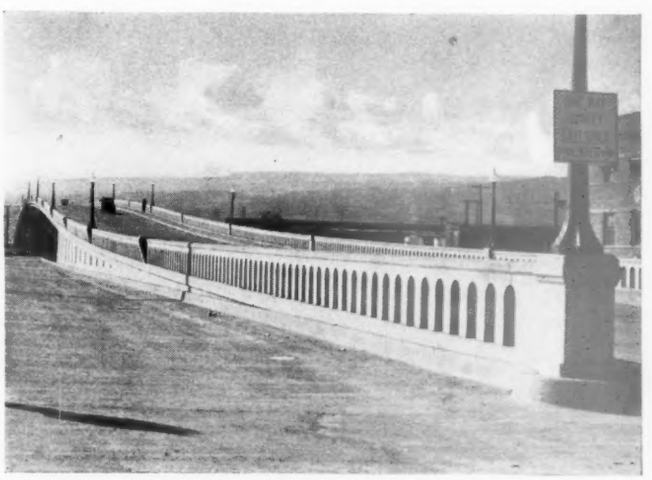
854 separation and 108 signal protection projects were completed as of February 28, with another 881 separation and 309 protection projects underway—Total of 3,008 projects approved

QUIETLY, yet no less definitely, the $200,000,000 federal program for eliminating the hazards at railway-highway grade crossings, provided for in the Emergency Relief Appropriation Act of 1935, moves ahead. According to figures compiled by the United States Bureau of Public Roads as of February 28, grade crossing projects to the extent of $58,486,577 have been completed under the program; another group of such projects involving an estimated expenditure of $102,853,221 is under construction, and still another group, involving an estimated expenditure of $14,049,376, has been approved and should be put under construction at an early date. Perhaps a still more effective picture of the progress made is gained in the fact that of the $200,000,000 allotted, only $24,171,908 had not been assigned definitely to specific projects by February 28.

Rapid Progress in Last Six Months

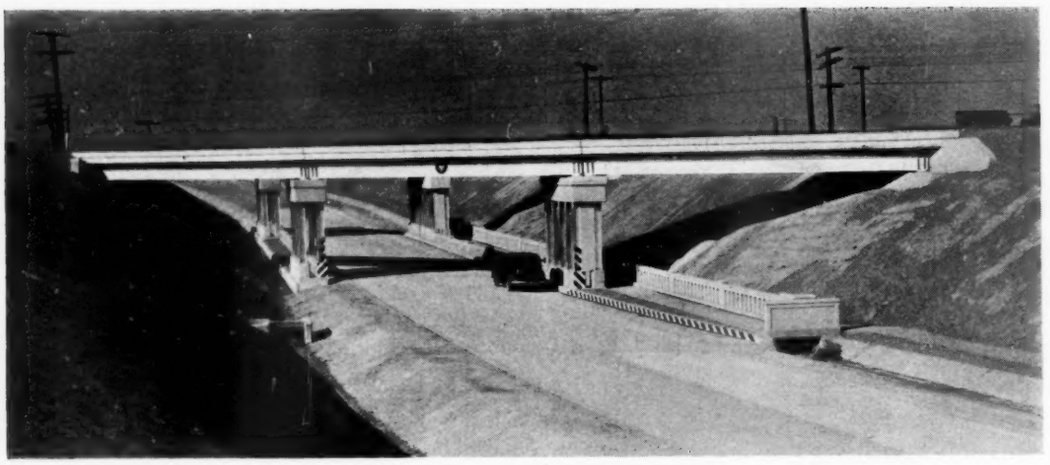
While the federal program funds were made available early in April, 1935, all of the progress made has occurred during the last 18 months, beginning with August 29, 1935, when the original rules and regulations promulated to govern the work were modified to put them on a workable basis. Within this period, the work has forged ahead progressively.

By the first of January, 1936, plans, specifications and estimates covering 595 projects, estimated to cost approximately $51,127,000 had been approved. Of these, 311 projects had been placed under contract and 177 were actually under construction. Pressing forward with the program, by August 31, 1936, eight months later, 250 grade crossings had actually been eliminated through the separation of grades or the relocation of highways, 12 grade crossings had been afforded signal protection, and 34 existing structures separating railway-highway grades had been reconstructed to meet modern requirements, at a total cost of $11,407,438. At the same time, elimination or relocation work was under way at 1,093 other crossings, 153



An Attractive Structure Carries the Highway Over the D.&R.G. at Grand Junction, Colo.

* All photographs, courtesy U. S Bureau of Public Roads.



A Federal Project on the Missouri Pacific and the Santa Fe at Pueblo, Colo.

existing structures were being rebuilt, and signal protection was being provided at 33 crossings, at a combined cost of approximately $110,161,184.

At the time of the latest report on the program, issued by the U. S. Bureau of Public Roads as of February 28, and representing six months' progress beyond the last figures just quoted, 854 separation projects, 147 reconstruction projects, and 108 signal protection projects had been completed, at a total cost of $58,486,577. This indicates that within the six-month period from August 31, 1936, to February 28, 1937, 604 elimination projects, 113 reconstruction projects, and 96 signal protection projects were completed.

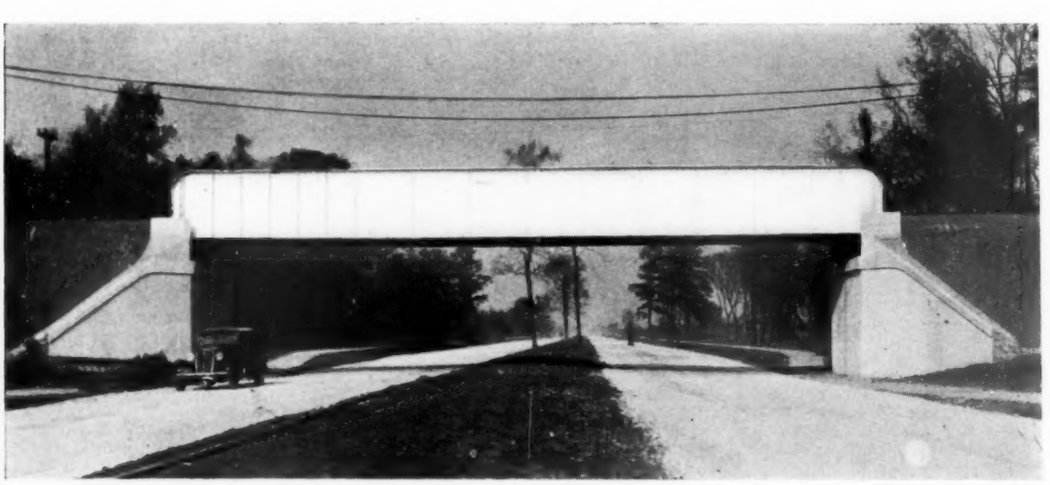
In addition to the work completed by February 28, the report as of that date, reproduced as a chart with this article, shows that 881 elimination projects, 133 reconstruction projects, and 309 signal protection projects, involving an estimated total expenditure of $102,853,221, were under construction, and that plans had been approved for 120 additional elimination projects, 37 reconstruction projects, and 419 signal protection projects, to cost in the aggregate $14,049,376. Totaling the cost of projects completed, under way and approved, shows that as of February 28 only $24,171,908 of the $200,000,000-appropriation was still unassigned and available for additional projects, this representing approximately 15 per cent of the total sum.

Work Far Ahead in Some States

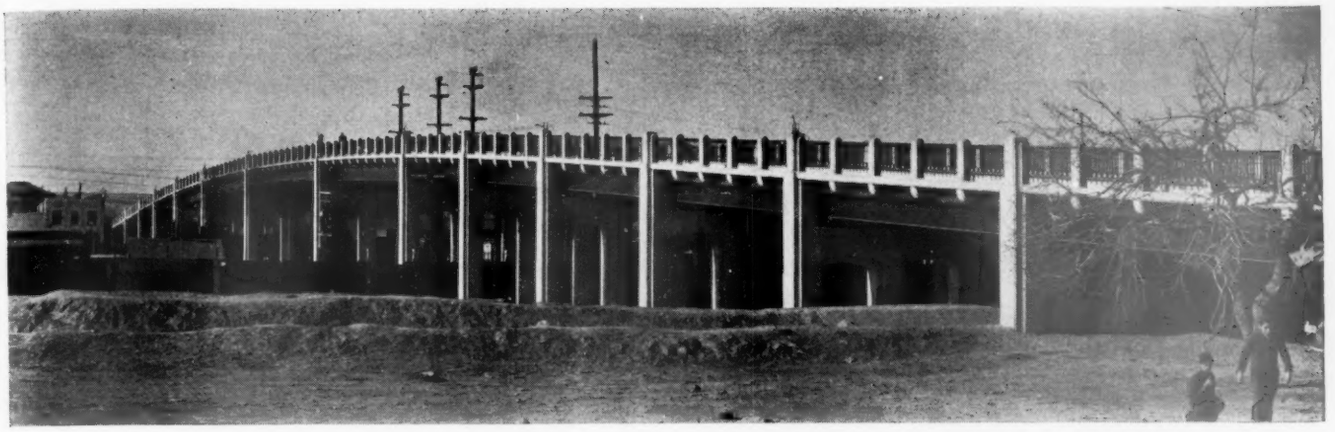
As has been the case since the beginning of the program, some of the states have made greater progress than others, depending largely upon the degree of harmony which has existed between the federal and the state administrations and, in no small measure, to the efficiency of the respective state highway departments. Six months ago, as pointed out in a review of the status of the federal program presented in the *Railway Age* of September 12, 1936, those states leading in the number of grade separation and relocation projects completed were Minnesota, with 23 crossings, Texas, with 18 crossings, and Arkansas, Montana and Oklahoma, each with 17 crossings. The states with the largest number of separation and relocation projects completed or undertaken at that time were Texas, with 106 projects, Iowa, with 78 projects, Minnesota, with 76 projects, and Nebraska, with 69 projects.

As a result of the work done during the last six months, this line-up has changed, and, as regards completed grade separation and relocation projects, Texas now leads with a total of 83 such projects, followed in order by Minnesota, with 68, Nebraska, with 56, and Iowa, with 55. As of February 28, the states with the largest number of separation or relocation projects completed or undertaken were Texas, with 143 projects, Iowa, with 113 projects, Minnesota, with 97 projects, and Nebraska, with 80 projects.

As regards the completion of grade crossing protection installations, Minnesota is far in the lead, having completed 28 such installations during the last six months, bringing the total of such installations completed in the state under the federal program to 37. The states which have completed the next largest number of protection installations are, in order, Tennessee, South Dakota and Vermont, with 16, 15 and 14 installations, respectively. That this line-up may be expected to



A Long Steel Girder Span Separates Grades at an Important Crossing in Alabama



Long Steel and Concrete Overpass Built With Federal Funds over the Santa Fe at Albuquerque, New Mexico

change materially in the next few months is seen in the fact that Indiana, with no protection projects completed at the present time, has 162 such projects under construction, and that North Carolina, also with no protection projects completed as of February 28, has 96 such projects under way. Eventually, also, Texas will figure prominently in the matter of grade crossing protection since, while it has no such projects completed or under way at the present time, 177 such projects have been approved for construction.

Populous States Making Good Record

While the number of various types of projects completed or under construction in the different states is an indication to some extent of the degree of co-operation of the states with the federal grade crossing program, it does not indicate necessarily that those states with the smaller number of projects completed or under way have extended less co-operation or have made poor progress under the program. Furthermore, as pointed out in the earlier article, previously referred to, in any observation to this end, consideration must be given not alone to the number of projects completed and under way, but also to the character of the projects and to the types and size of structures being built.

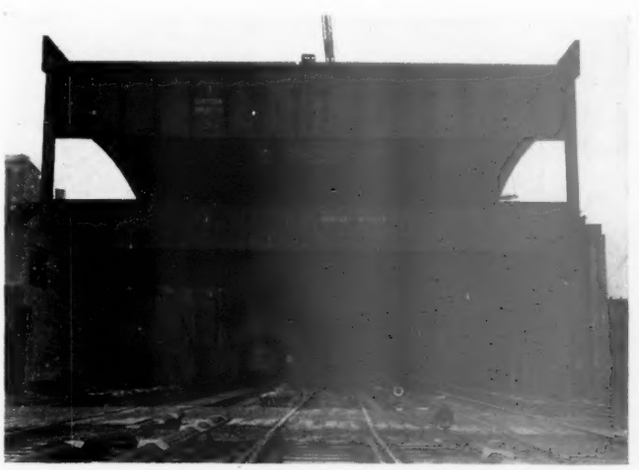
Obviously, these factors are reflected in the status of the programs in New York, Pennsylvania, Illinois and California, where, with many fewer crossing projects completed or under way than in Texas, the amount of money being expended is practically equal to or more than that being expended in Texas. In New York, for example, where there was a total of 79 separation and reconstruction projects completed or under way as of February 28, the total cost of these projects is estimated to be $11,913,024, which is $1,983,282 more than the estimated cost of the larger program by 64 projects in Texas. In other words, the figures show that the average cost of separation and reconstruction projects undertaken in New York is slightly in excess of $150,000, as compared with an average cost of $70,000 for similar projects undertaken in Texas. Obviously, with such a spread in size and cost of consideration, it is possible for New York to be as far advanced with its program as Texas, with materially fewer projects involved.

One rather discouraging phase of the federal program is that a considerable portion of the funds at this late date has not reached the construction stage, and that in some cases there appears to be an unnecessarily large time interval between the approval of projects by the Bureau of Public Roads and actual construction operations. Some of the most apparent delays have been with regard to crossing protection installations.

It is true that 96 such installations were completed and 372 such installations were put under construction between August 31, 1936, and February 28, 1937, but it is noticeable, for example, that no apparent headway has been made in this regard in Texas, where, with no projects completed to date, 176 protection projects have been approved for construction for a period of at least six months without getting any of them under way. It is also noticeable that in Indiana a group of 162 approved crossing projects remained on the inactive list for a period of at least six months, having moved into the construction column only during the month of February last.

It is true, of course, that winter conditions have held up both construction and signal protection work in some localities, but this factor has not had a bearing in the South, and little, if any, bearing in many parts of the North, where apparent delays have been as great as anywhere in the country. The causes of delays have been many, but the more important ones according to those in a position to know, include lack of political harmony, inadequate organization on the part of state highway departments, difficulty in acquiring necessary lands for improvement projects, differences of opinion as regards methods of handling the work, and complicated methods of letting contracts for materials and equipment.

As regards crossing protection installations, the greatest retarding factor in certain states seems to be the



Federal Funds Are Building a Section of Express Highway Over the Tracks of the New York Central in New York City

Current Status of United States Works Program Grade Crossing Projects

(As Provided by the Emergency Relief Appropriation Act of 1935)

AS OF FEBRUARY 28, 1937

State	Apportionment	Completed: Estimated Total Cost	Completed: Works Program Funds	Completed: Number Grade Crossings Eliminated by Separation or Relocation	Completed: Number Grade Crossing Structures Reconstructed	Completed: Number Grade Crossings Protected by Signals or Otherwise	Under Construction: Estimated Total Cost	Under Construction: Works Program Funds	Under Construction: Number Grade Crossings Eliminated by Separation or Relocation	Under Construction: Number Grade Crossing Structures Reconstructed	Under Construction: Number Grade Crossings Protected by Signals or Otherwise	Approved for Construction: Estimated Total Cost	Approved for Construction: Works Program Funds	Approved for Construction: Number Grade Crossings Eliminated by Separation or Relocation	Approved for Construction: Number Grade Crossing Structures Reconstructed	Approved for Construction: Number Grade Crossings Protected by Signals or Otherwise	Balance of Funds Available for New Projects
Alabama	$4,034,617	$2,372,711	$2,372,711	33	1	4	$1,457,214	$1,457,214	15	..	..	$10,140	$10,140	..	..	8	$194,552
Arizona	1,256,099	825,527	821,292	9	..	..	348,834	337,389	4	..	..	.....	.....	..	..	..	97,418
Arkansas	3,574,060	1,375,086	1,370,999	31	4	..	1,976,073	1,972,740	24	2	2	187,908	187,638	1	..	27	42,683
California	7,486,362	4,659,846	4,508,931	26	8	..	2,753,329	2,659,960	18	..	..	.....	.....	..	..	..	317,471
Colorado	2,631,567	1,266,630	1,239,816	21	1	..	938,584	938,582	8	..	..	.....	.....	..	..	..	453,170
Connecticut	1,712,684	73,479	73,479	..	1	..	779,991	758,630	5	..	1	76,314	76,314	..	1	..	804,261
Delaware	418,239	.....	.....	..	..	..	130,000	130,000	1	..	..	.....	.....	..	..	..	288,239
Florida	2,827,883	1,386,706	1,384,395	12	5	..	1,001,197	1,000,854	16	1	..	178,000	178,000	2	..	..	264,634
Georgia	4,895,949	30,706	30,706	..	2	..	770,657	770,657	16	2	..	280,154	280,154	6	..	30	3,814,433
Idaho	1,674,479	903,139	896,674	14	1	2	370,886	370,773	5	1	..	32,125	32,125	..	..	19	374,907
Illinois	10,307,184	4,012,459	4,011,582	44	1	..	4,896,143	4,792,943	24	5	..	1,429,800	1,429,800	8	1	..	72,859
Indiana	5,111,096	1,446,492	1,443,966	17	8	..	3,820,871	3,661,152	25	4	162	.....	.....	..	..	..	5,977
Iowa	5,600,679	1,984,666	1,927,117	49	6	..	3,417,373	3,394,668	55	3	..	325,615	253,980	3	..	8	24,914
Kansas	5,246,258	768,134	768,005	11	..	3	4,544,944	4,470,102	47	1	..	6,549	6,549	..	..	2	1,602
Kentucky	3,672,387	878,563	878,563	12	2	..	1,886,660	1,596,928	10	2	..	312,506	312,506	3	4	..	884,389
Louisiana	3,213,467	.....	.....	..	..	..	1,656,948	1,656,948	18	1	..	862,863	818,146	5	3	..	738,372
Maine	1,426,861	488,969	488,506	12	..	2	584,695	584,103	8	..	..	158,534	158,534	1	1	..	195,718
Maryland	2,061,751	358,388	358,388	3	3	..	512,104	512,104	3	..	17	606,404	583,936	2	2	2	607,323
Massachusetts	4,210,833	888,240	888,240	7	2	..	2,052,433	2,052,433	16	1	..	350,743	350,743	1	1	..	919,417
Michigan	6,765,197	3,327,414	3,278,275	34	4	..	3,454,277	3,454,277	11	4	..	.....	.....	..	..	..	32,645
Minnesota	5,395,441	2,845,392	2,775,354	59	9	37	2,509,840	2,482,579	26	3	3	58,428	58,428	..	1	1	79,080
Mississippi	3,241,475	712,987	712,839	20	3	1	1,881,773	1,881,773	32	1	..	37,270	37,270	1	..	4	609,593
Missouri	6,142,153	518,962	518,962	9	..	..	5,469,404	5,273,160	39	1	..	367,251	253,300	1	..	2	96,731
Montana	2,722,327	2,469,975	2,469,470	35	6	..	178,582	178,582	2	..	..	.....	.....	..	..	..	74,275
Nebraska	3,556,441	1,522,423	1,520,188	55	1	1	1,652,289	1,652,289	22	2	5	335,738	335,738	4	..	18	48,226
Nevada	887,260	690,198	690,198	7	3	..	211,658	193,432	1	..	..	3,630	3,630	..	..	5	.....
New Hampshire	822,484	341,748	341,748	3	3	..	235,462	235,417	3	1	1	168,326	168,326	2	..	..	76,993
New Jersey	3,983,826	619,488	619,488	4	2	..	2,145,687	2,134,642	15	1	..	570,450	570,450	2	4	..	659,246
New Mexico	1,725,286	1,053,490	1,053,475	13	1	..	673,091	670,400	6	..	..	.....	.....	..	..	..	1,410
New York	13,577,189	2,273,973	2,269,173	12	8	..	9,639,051	9,383,005	28	31	..	803,830	803,830	1	7	..	1,121,181
North Carolina	4,823,958	945,170	945,170	14	8	..	2,688,112	2,668,561	31	8	96	399,880	399,880	4	1	15	810,347
North Dakota	3,207,473	508,246	508,246	16	..	..	2,002,970	1,999,413	27	4	..	335,570	335,570	10	..	..	364,245
Ohio	8,439,897	327,460	261,968	2	..	..	5,247,354	5,089,353	34	5	..	2,265,200	2,108,142	18	2	3	980,434
Oklahoma	5,004,711	1,477,537	1,477,467	30	3	..	1,925,554	1,925,554	21	3	..	280,280	280,280	5	2	3	1,321,410
Oregon	2,334,204	878,991	878,451	8	5	2	1,491,605	1,410,005	8	1	..	.....	.....	..	..	..	45,748
Pennsylvania	11,483,613	1,964,345	1,760,257	26	8	..	7,160,942	6,739,375	44	8	9	514,840	427,628	2	2	..	2,556,353
Rhode Island	699,691	655,074	654,008	4	1	..	25,386	25,386	..	1	..	39,260	12,812	..	1	..	7,485
South Carolina	3,059,956	540,859	533,207	13	2	3	1,390,302	1,378,959	24	8	..	338,255	338,255	5	..	45	809,535
South Dakota	3,249,086	738,732	738,732	22	1	15	1,440,449	1,440,449	31	3	10	335,615	335,615	8	1	17	734,290
Tennessee	3,903,979	549,023	549,013	11	1	16	1,556,502	1,556,502	21	2	2	1,217,068	1,217,068	10	..	7	581,397
Texas	10,855,982	4,110,331	4,108,006	72	11	..	5,819,411	5,815,170	57	3	..	466,870	466,863	..	..	177	465,943
Utah	1,230,763	87,218	85,828	1	1	..	1,107,705	1,107,705	16	..	..	2,700	2,700	..	..	1	34,529
Vermont	729,857	499,385	493,786	7	5	14	226,483	186,400	3	1	1	1,380	1,300	..	..	1	48,371
Virginia	3,774,287	1,599,614	1,528,749	30	7	1	774,431	735,432	7	7	..	632,500	632,500	12	3	18	877,607
Washington	3,095,041	1,015,902	1,011,070	15	5	7	1,824,355	1,823,930	8	6	..	7,908	7,908	..	..	2	252,133
West Virginia	2,677,937	.....	.....	..	..	..	1,689,833	1,689,831	20	3	..	49,472	49,472	3	..	4	938,634
Wisconsin	5,022,683	2,028,154	1,998,580	25	4	..	2,935,206	2,843,954	12	3	..	.....	.....	..	..	..	180,149
Wyoming	1,360,841	464,745	464,638	6	..	..	648,627	648,624	6	..	..	.....	.....	..	..	..	247,579
Dist. of Columbia	410,804	.....	.....	..	..	..	425,564	396,804	3	..	..	.....	.....	..	..	..	14,000
Hawaii	453,703	.....	.....	..	..	..	522,380	453,703	5	..	..	.....	.....	..	..	..	.....
Totals	$196,000,000	$58,486,577	$57,709,716	854	147	108	$102,853,221	$100,592,846	881	133	309	$14,049,376	$13,525,530	120	37	419	$24,171,908

method of awarding contracts; not for single complete installations or groups of installations as a whole, but rather on the basis of the individual parts and materials going to make up the different installations. In the case of some parts, there are only a few manufacturers equipped to bid, while in the case of many other parts or units of equipment entering into the installations, there may be a hundred or more manufacturers who are in a position to seek the business, and who, under the arrangement set up, are being given that opportunity. The amount of work and delays involved in this breakdown method of awarding contracts become evident when it is realized that the average protection installation may involve as many as 150 to 200 separate items, depending upon local conditions.

No changes of importance have been made in the rules and regulations laid down by the Secretary of Agriculture or the U. S. Bureau of Public Roads for carrying out the work, since the fundamental changes announced on August 29, 1935, which removed the restricting labor requirements which for a time held all progress in abeyance. Neither have there been any important changes as regards the types of structures which may be built or the types of equipment which may be employed.

Records are not available at the Bureau showing the number of crossings involved in the different projects, the extent to which the individual railways are affected, or the extent to which specific types of structures and signal protection equipment are being employed. Even estimates are impossible at this time, but a review of hundreds of construction progress photographs in the Bureau's files from every state in the Union, indicates that, at least as regards the hundreds of separation projects reported upon photographically, the use of steel and concrete predominates in all states, and that an obvious attempt is being made to give weight to appearance as well as to practicability and durability.

Both the flashing-light type signal, and the wig-wag type signal giving substantially the same warning indication, have been installed at many crossings and are represented in the Bureau's completion photograph record, and, while no photographs of barrier-type protection installations appear as yet, it is understood that several such installations have been made with the approval of the Bureau and the states and railroads involved, and that many more are under consideration.

Federal Program Extended

One of the most important developments in the railway-highway grade crossing situation during the last 12 months was the additional appropriation by Congress for continuing the eliminating of hazards at railway-highway grade crossings during the two years ending June 30, 1938, and June 30, 1939. This appropriation, voted on June 16, 1936, makes available to the states a total of $50,000,000 for each of the two years, earmarked specifically for grade crossing elimination, reconstruction and protection projects. The money is to be apportioned to projects involving the various railways on the same basis as the larger emergency relief fund now being expended, and, like that fund, requires no matching of money by the states or the railways.

That this will not relieve the states and the railways of all expense is seen in the fact that in carrying out the new work to be undertaken, the states and the railways must bear the expense of all land necessary to the work and the cost of all damages. That this will involve a sizeable amount is indicated by the fact that in the projects already approved under the present large program, the combined share of the expense being borne by the states and the railways will exceed $4,000,000.

The rules and regulations under which the federal appropriation for the next two years may be spent are, with a few exceptions, identical with those governing the expenditure of funds under the present $200,000,000 appropriation. One of the exceptions is that, in addition to being available for the separation of grades at crossings, the provision of protection at grade crossings, the reconstruction of existing grade separation structures, and the relocation of highways to eliminate grade crossings, it is specifically provided that "the funds may be used for the relocation of railway lines to eliminate grade crossings, whenever deemed as the most economical and effective procedure by the affected interests." It is also noticeable that whereas the earlier rules placed considerable emphasis upon the selection of projects which, among other things, would tend to promote employment in those areas where unemployment was most acute, the present rules omit reference in this regard, although it is to be expected that the question of providing employment where most needed will not be overlooked.

Unnecessary Crossings to Be Closed

Possibly the most important change in the new rules is one insisting upon the physical closure of grade crossings rendered unnecessary by new grade separation structures. The rule in this regard is as follows: Where legal authority exists for the physical closure of railroad grade crossings, and where, by the construction of a grade separation structure with adequate approaches, the use of an existing grade crossing or grade crossings is rendered unnecessary for the convenience of the general public, approval of a project for the construction of a grade separation structure shall be contingent upon prior provision for the physical closure of such grade crossing or crossings after the completion of the structure and adequate approaches thereto. Any lateral connections necessary to accomplish the physical closure of such existing grade crossings may be included as a part of the project and paid for with the grade crossing funds.

Thus, the federal program to eliminate the hazards at railway-highway grade crossings will go forward on a sizeable scale during the next two years, on an even sounder basis than the present program, with the prospect that, in view of the changed conditions on the highways, the program may be extended from year to year as a definite part of the regular federal-aid highway program.

* * *

On the Boston & Albany at Worcester, Mass.

One of the Many Relocations—New Line on the Right, Old Roadbed on the Left and Temporary Connection in the Left Fore-Ground

Santa Fe Reduces Curves on Chicago-Los Angeles Line

Fixes on 1 deg. 30 min. as desired maximum and makes hundreds of reductions to remove speed restrictions

THE largest program of curve reduction undertaken recently has been prosecuted by the Atchison, Topeka & Santa Fe during the last two years on its line between Chicago and Los Angeles, Cal., via La Junta, Colo., for the purpose of expediting the movement of fast trains. While these improvements are of immediate importance in eliminating speed restrictions for the Santa Fe's Super Chief, with its schedule of 39¾ hr. between these terminals, they will prove of benefit also in stepping up the speeds of other passenger trains as well as freight trains.

The primary objective of this program is the reduction in the rate of curvature in locations where the curve necessitates deceleration from the speed that could otherwise be maintained at the given location. However, reduction in the rate of curvature, in not a few locations, has involved changes in alinement that have resulted also in reductions in the total curvature as well as some savings in distance. Furthermore, this project has also embraced the adoption of new standards for both superelevation and easement curves, with the result that all curves in fast track territories are being adjusted to the new standards, regardless of whether they were subjected to reduction in the rate of curvature. In addition, the Santa Fe has carried on an extensive program for the general refinement of line and surface.

Cannot Remove All Restrictions

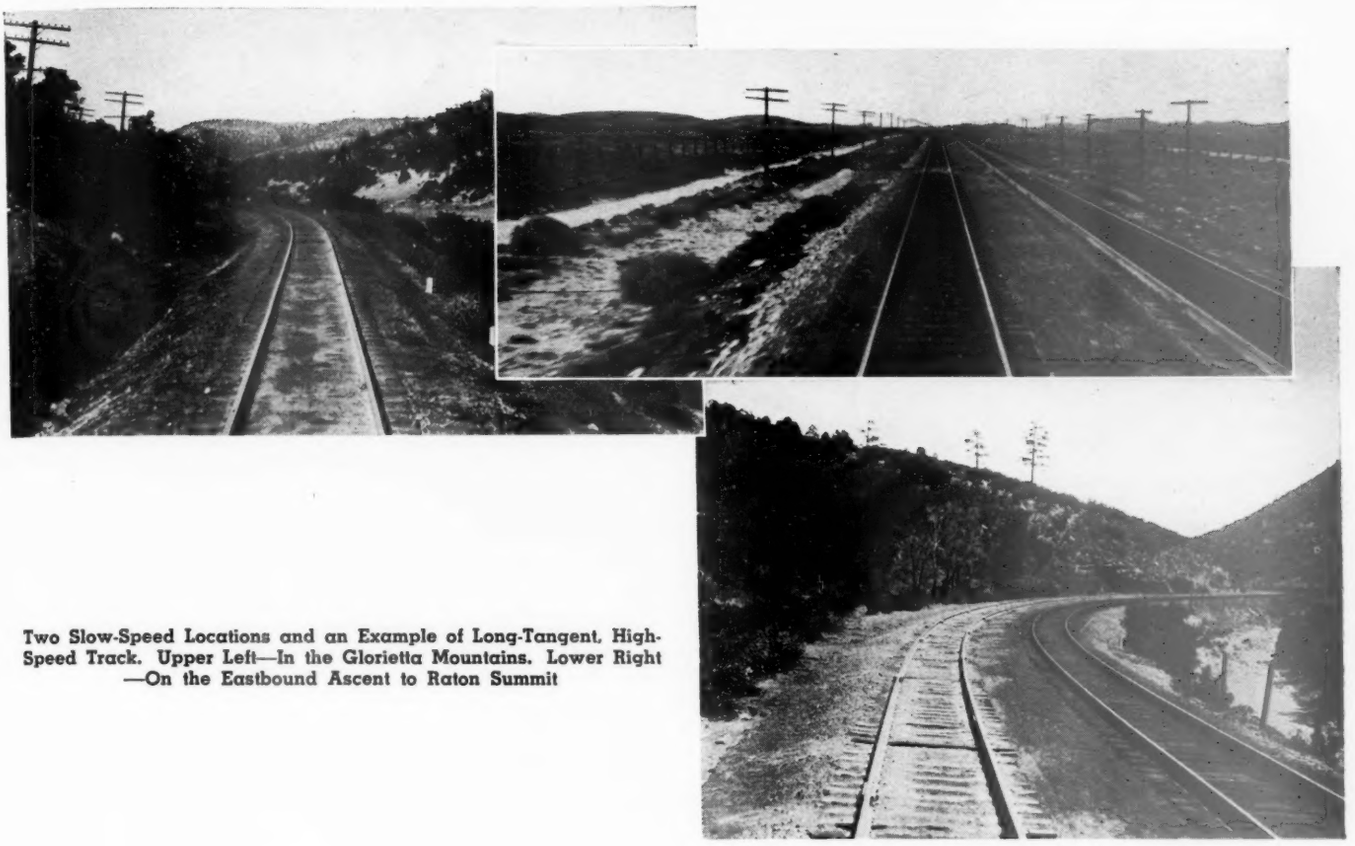
Obviously, it is not physically or economically feasible to carry such an improvement program to the point that would permit of unrestricted speeds throughout the entire length of a transcontinental line that crosses five major mountain summits and several minor ones. On some of these mountain crossings the limits on the speed imposed by the grades are such that curves as sharp as 10 deg. do not impose restrictions. Furthermore, there are obviously many locations on mountain sides or in canyons where changes in alinement for the purpose of reducing curvature would entail prohibitive expenditures.

However, this 2227-mile route embraces many long stretches of line where both the grades and alinement are such as to favor sustained high speeds, except for the fact that the line was built (and in some cases relocated) when there was no reason to believe that a two-degree curve, or even a three-degree curve, would ever impose speed restrictions. The problem confronting the operating and engineering officers of the Santa Fe was to select the locations where revisions would produce the greatest improvement for the least expenditure, and this proved no easy task.

Standard Superelevation and Permissible Speeds on Curves

Degree of Curve	Superelevation	Speed m.p.h.	Length of Spiral Feet
30 min.	1½ in.	95	170
1 deg.	3 in.	95	340
1 deg. 30 min.	4½ in.	85	460
2 deg.	5½ in.	80	530
3 deg.	6 in.	65	470
4 deg.	6 in.	60	430
5 deg.	6 in.	50	360
6 deg.	6 in.	50	360

Since the allowable speed on a curve is dependent on the superelevation, the first step was to fix the superelevation, and the decision in this matter, which is necessarily a compromise between the conflicting requirements of slow and high speeds, was to adopt maximum elevations ranging from 1½ in. for a 30 min. curve to 6 in. for curves of 3 deg. and over. The next step was to define the permissible speed in terms of degree of curvature and superelevation, and since any speed that gives a comfortable ride on a curve is less than the safe speed



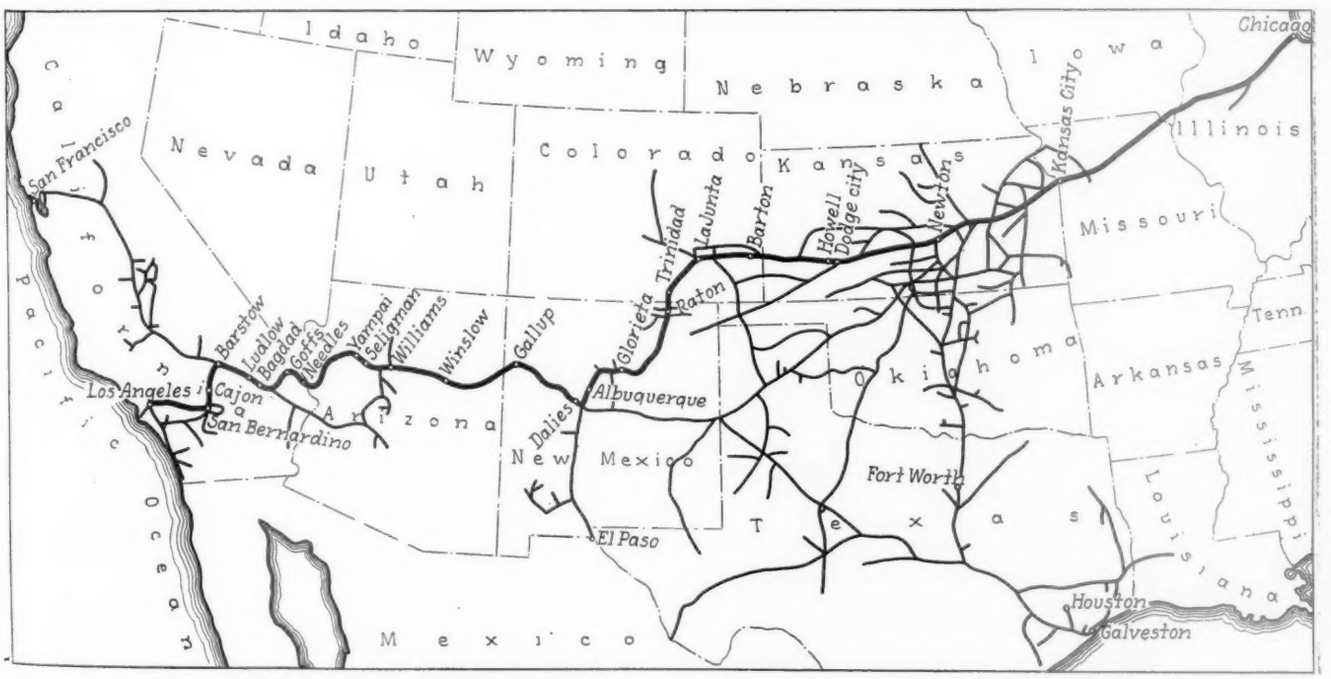
Two Slow-Speed Locations and an Example of Long-Tangent, High-Speed Track. Upper Left—In the Glorietta Mountains. Lower Right —On the Eastbound Ascent to Raton Summit

and considerably below the over-turning speed, the decision, based on observed riding conditions on various curves at various speeds, permits speeds corresponding to a 3-in. unbalanced elevation for curves of about one deg. and over, and less unbalanced elevation (approximately 30 miles greater than equilibrium speeds) for curves lighter than one deg.

The standard superelevation and the permissible speeds on curves ranging from 30 min. to 6 deg. are given in the accompanying table.

The lengths of spirals were established on the basis that the rate of change of superelevation must not exceed 1¼ in. per sec. For a two-deg. curve which is elevated 5½ in. and may be traversed at 80 miles per hour, the spiral length is 530 ft.

Before any program of curve revision could be undertaken it was necessary to establish a "maximum desired" rate of curvature, and it was found that 1 deg. 30 min. was the economical maximum. Lower values would permit higher speeds, but would result in an increase in the



The Atchison, Topeka & Santa Fe System—Route of the Super Chief Indicated by the Heavy Line

Four-Mile Relocation Near Gorin, Mo.—New Roadbed on the Left, Old Operated Line on the Right

number of cases where a change would not be feasible and would increase the cost. While this standard is being followed generally it has been departed from in certain locations where the cost of reducing a curve to a maximum of 1 deg. 30 min. would be prohibitive.

Wide Range of Conditions

Some idea of the range of conditions encountered on the Santa Fe in the search for opportunities to expedite fast train movements is to be had from the comparison of the schedules of the Super Chief over the 202 miles from La Junta, Colo., to Dodge City, Kan., and over the 22.8 miles from Raton, N. M., to Trinidad, Colo. In the first location, with a minimum of curvature and no eastbound grades in excess of 0.60 per cent the train operates on a scheduled average speed eastbound of 78.2 miles per hour. This territory embraces the longest stretch of line without any speed restriction whatever, namely, the 128 miles from near Barton, Colo., to Dodge City, Kan.

Between Raton and Trinidad, the line crosses the Raton mountains and the schedule allows the Super Chief 57 min. eastbound and 56 min. westbound for the 22.8 miles, a fact that is easily understood when it is realized that power limitations impose severe restriction on the speeds in the ascent of the 3.3 per cent and 3.5 per cent grades eastbound and westbound, respectively. Only slightly greater speeds are permissible on these heavy grades in the descending direction because the energy to be absorbed in deceleration from all but the most moderate speeds is so great that a stop on the "hill" might lead to excessive brakeshoe and wheel temperatures.

In general, therefore, it may be said that the selection of the curves to be revised called for a careful study of the alinement map and the profile, and in particular locations it was necessary to develop speed diagrams, based in the beginning on data supplied by the manufacturer on the characteristics of the Diesel locomotives provided for the Super Chief, and later on data obtained by actual road tests, but keeping in mind the improvement in performance that will result with the use of lighter cars.

A Relocation Involving Heavy Work—Old Roadbed on the Right

The Questions Asked

The two main criteria to be considered in dealing with an individual curve are: What will the revision accomplish in improved train performance, and what will it cost? Obviously it is possible to justify a greater expenditure to reduce a single curve that connects two long tangents on which there are no other speed restrictions than on any one of a series of curves located short distances apart. But even in the first case, the expenditure would not be warranted unless the grades were such that high speeds would be possible. As a general statement, it may be said that a reasonable expenditure for the revision of a curve is warranted if the revision is effective in removing a speed restriction that has required an appreciable deceleration in speed below that allowed beyond both ends of the curve.

Two procedures are being followed in reducing the rate of curvature, of which the simplest and cheapest (where it can be applied) comprises the lining in of the track (to increase the "external distance") by a sufficient amount to effect the desired change. The other, involving two or more curves, entails a relocation in which the number of curves, the total central angle, or the distance, or all three, may be reduced, as well as the degree of curvature. The individual projects follow no general rule as to either magnitude or cost. Among the larger projects was one covering four miles of line between Paquita, N. M., and Sandia, that involved 162,000 cu. yd. of excavation and 141,000 cu. yd. of embankment and was effective in replacing 11 curves ranging from 3-deg. to 6-deg., with 3 curves of 1 deg. 30 min., and which reduced the total curvature 375 deg. 17 min. and the distance by 3,193.33 ft.

However, the number of these relocations is small compared with the number of projects involving solely a change in the rate of curvature of individual curves. But because most of the line changes, like the one cited above, involved groups of curves, the total number of curves embraced in the line changes does not differ greatly from the number of individual curve revisions. An idea of the work accomplished in the aggregate is afforded by the table of curves covered by the line changes and curve reductions completed as of February 28, 1937.

Scope of the Work

As seen in this table the work already completed has resulted in the elimination or reduction of 479 curves,

Improved Alinement Involved Cut on the Right That Was Avoided in the Original Location

counting each curve on parallel double tracks as two curves. Of these curves, 228 have been reduced or eliminated as the result of line changes, while 251 were reduced individually by throwing the track. The line changes resulted in the elimination of 1,844 deg. 42 min. of central angle and a saving of 9081.7 ft. of distance in the westbound route from Chicago to Los Angeles, and in the elimination of 1782 deg. 49 min. of central angle and 7984.6 ft. of distance in the eastbound route. The individual curve reductions saved 1574.8 ft. and 1501.3 ft., respectively, in the westbound and eastbound routes, with the result that the work done to date has shortened the route distance between Chicago and Los Angeles about two miles.*

Number of Curves Covered by Line Changes and Curve Reductions Completed Between January 1, 1935 and February 28, 1937

Between	West Bound	East Bound	Single Track
Chicago and Kansas City			
Line changes	11	11	
Curve reductions	14	14	
Kansas City and La Junta			
Line changes			13
Curve reductions	4	4	11
La Junta and Albuquerque			
Line changes			82
Curve reductions			21
Albuquerque and Los Angeles			
Line changes	44	41	26
Curve reductions	96	82	5
Chicago and Los Angeles			
Line changes	55	52	121
Curve reductions	114	100	37
Total	169	152	158

Other opportunities for the improvement of the Chicago-Los Angeles line are being investigated, but, like the work completed thus far, each project must be considered on its individual merits and also in its relation to suggested changes in adjoining stretches of the line. This involves an enormous amount of painstaking study and necessarily precludes any large blanket authorizations—the projects are approved individually as circumstances warrant. As a consequence a forecast of the eventual scope of line revisions is impossible. The following description of the nature of the work that has been carried out on various parts of the line to date affords some measure of its varied character.

Work Authorized by Individual Projects

To date, the work across Illinois, Iowa, Missouri, and east of Newton, Kan., has been confined to a small number of relocations. In the 356 miles from Newton to La Junta, Colo., there were only 119 curves in all, of which but 46 were restrictive. Twenty-four of these have been reduced or eliminated, and those remaining that restrict speed are on the program for reduction in the near future.

A much heavier program is contemplated in the 346 miles from La Junta to Albuquerque. This line embraces everything in the way of railway location from flat open country to the rugged terrain of the Raton and Glorietta mountains. While no changes can be made on the two mountain crossings, much of the rest of the territory has been studied with a view to making curve revisions, of which a large number have been carried on. However, there are some sections of the road where improvements in alinement would entail rather extensive line changes that are still under consideration.

In the 288 miles between Albuquerque and Winslow, Ariz., the situation is generally much more favorable for high speeds. The ruling grade westbound is 0.6 per cent except for one short stretch of 1.0 per cent from Isleta, N. M., to Dalies, and with the curve work completed or planned it will be possible to confine speed restrictions to

* Changes in distance and central angle on the two routes do not coincide because of differences in the nature and magnitude of the work done in locations where the two tracks are not parallel, but the considerable discrepancy in distance saved arises primarily from the fact that a line change at Chino, Ariz., which was made to effect a grade reduction, involved an appreciable increase in distance in the eastbound track.

Tracks on New Alinement on the Right, Old Roadbed on the Left

A Track-Throwing Operation—The Track Was Shifted to its Position at the Right on the Skid Rails

a few locations, where alinement changes are prohibitive. Little work has yet been authorized in the 142 miles between Winslow and Seligman, Ariz., that embrace the climb over the Arizona summit, for in much of this territory speed is limited by ruling grade.

West of Seligman no general statement can be made other than that the decisions made have been based on a study of the wide diversity of physical conditions. Curve revisions have been made to expedite train movements across the high speed "flats," but little can be done in the intervening canyons. At Chino, just west of Seligman, a change of line in the eastbound track for a distance of three miles has been made with the primary objective of reducing the grade from 1.4 per cent to 1.0 per cent, ascending westward.

Although it is impossible to effect improvements in the more rugged portions of the territory between Yampai, Ariz., and Barslow, Cal., without heavy expenditure, there are parts of this line where changes of alinement and reductions in rate of curvature are justified. An outstanding case of this kind is the stretch of 60 miles between Goffs, Cal., and Bagdad, where the westbound grade and the alinement favor high speed, and it was decided to reduce the restrictions to the minimum by reducing the few curves in the westbound track in this stretch of line (including three 1-deg. 30-min. curves) to 1-deg. curves.

In the 56 miles from Barstow to the summit of Canjon pass, all curves between Barstow and Oro Grande, 32 miles, that restricted speed, have been reduced. From Oro Grande to Cajon summit, 24 miles, surveys are being made to develop a feasible plan to reduce curvature. This will involve a line change which is programmed for future handling. On the west slope of these mountains, where the eastbound track is on an ascending grade of 2.2 per cent and the westbound track is on a descending grade of 3 per cent no changes are contemplated, and between San Bernardino and Los Angeles, via Pasadena, city ordinances, grade crossings, and physical conditions other than curvature or grades impose speed restrictions so that no revisions in alinement are under consideration at this time.

Reduction in Central Angle and Distance, Line Changes and Curve Reductions As of February 28, 1937

Chicago-Los Angeles Route

	Westbound		Eastbound	
	Central Angle	Distance Feet	Central Angle	Distance Feet
Chicago and Kansas City				
Line Changes	79°-01′	396.5	79°-01′	396.5
Curve Reductions		162.8		162.8
Kansas City and La Junta				
Line Changes	142°-15′	191	142°-15′	191
Curve Reductions		123.5		123.5
La Junta and Albuquerque				
Line Changes	833°-28′	3011	833°-28′	3011
Curve Reductions		505		505
Albuquerque and Los Angeles				
Line Changes	789°-58′	5483.2	728°-05′	4386.1
Curve Reductions		783.5		710.0
Totals, Chicago to Los Angeles				
Line Changes	1844°-42′	9081.7	1782°-49′	7984.6
Curve Reductions		1574.8		1501.3
Totals, Line Changes and Curve Reductions	1844°-42′	10656.5	1782°-49′	9485.9

An Example of a Minor Curve Reduction—Approximate Location of Old Alinement Indicated by the Dotted Line

Track Improvements

Concurrent with the work of line revision, the curves that have not been reduced have been provided with longer spirals, the superelevation has been revised and the track generally has been improved. Some idea of the extent of this work is indicated by the fact that as many as 25 gangs embracing nearly 1,300 men were employed last summer on the various divisions west of Newton, Kan., in such work as surfacing, line changes, curve reduction, superelevation and spiraling.

The work has been planned carefully to avoid wasted

effort. Thus, the small gangs that re-spiral and superelevate curves do not work on curves that fall within the limits of surfacing programs, as those curves are adjusted by the surfacing gangs. Also, the surfacing work is skipped in territory where curve adjustments or relocations are contemplated. In addition, curve revisions or minor relocations are postponed in locations that would be affected by a major relocation that may be under consideration.

Grading in connection with curve revisions or line changes has been done under contract; all track work has been done by company forces. The throwing of track on curves to reduce the rate of curvature is being handled largely by the use of caterpillar tractors or cranes. By this method a curve 2,000 ft. long with a maximum throw of about 30 ft. can be shifted in two hours. So effective has this procedure proved that it is being employed for throws of as much as 80 ft., where the ground permits. In some cases the gap between the new and old roadbeds is bridged with rails to serve as skids on which the track is slid over into its new position.

The stepping up of train speeds has required some alteration of the block signal system which is principally of the three-indication type, either semaphore or color light. Included among the changes made are the use of higher masts and longer blades for semaphores and the lengthening of blocks. On double track, three-block signaling has been introduced in some locations, using a double yellow as the aspect to indicate occupancy of the third block. On single track the double caution plan has been introduced, whereby the caution indication is given for occupancy of either the second or the third block. Track circuits for highway-crossing signals have also been lengthened.

Along with this change in block signals, the Santa Fe has provided a complete installation of speed boards that govern the speed of both passenger and freight trains, each restrictive board bearing two figures, one for each class of service. Each board is set about 3,000 ft. in advance of the point where the restriction becomes effective and governs the speed of the train until it passes another board, either more or less restrictive, or a plain green board, which removes all restrictions.

This project for the expediting of train movements between Chicago and Los Angeles is not complete, but it constitutes a type of work in which each unit becomes productive as it is finished. The work completed thus far has already relieved many of the "tight spots" in the schedule of the Super Chief.

Retirement Board Annual Report

WASHINGTON, D. C.

THE Railroad Retirement Board has released its annual report for the period ending June 30, 1936, in which it enumerates the growing activities of the board and a few of the major problems connected with the administration of the act. The board points out four problems connected with the administration of the act in connection with which some changes in the law are desirable, as follows:

First, the experience, brief though it is, has revealed certain conflicts and ambiguities in the statute itself. First, the definition of the term "employment relation" specifies that a person, to be in such relation must, in addition to being on furlough or leave of absence from a carrier, and subject to call for service, also be "ready and willing to serve." No test of readiness or willingness is prescribed. The employment relation provision was inserted obviously for the protection of persons who, for reasons beyond their control, are unable to reenter active carrier service; those who return to service upon call qualify as employees without reference to the employment relation. In the months since the date of enactment, employment by carriers has been expanding. Many railroads have recalled into their service all those on furlough who still possess rights to return. But there remain some persons of long service, holding rights to jobs, but unable to return to service because of sickness or disability, frequently of a permanent character. They are more than "willing to serve" but perhaps not "ready." They regard themselves and are regarded by the railroads as employees, and they continue to receive many of the privileges of employees. It seems probable that, within a short time, the employment relation clause will prove to have been a nullity unless the language of the statute is clarified. The Board believes it to have been the intent of Congress to extend the protection of the act to all those who hold rights to work in the industry and are commonly regarded as employees except those who refuse to return upon call, although capable of service, and those who by other manifest action indicate unwillingness to serve; and clarification to accomplish this objective is accordingly recommended.

Again, the death benefit is payable to the spouse or certain other relatives of employees "receiving or entitled to receive an annuity." Since an annuity is payable only during retirement, it has seemed to the Board that death benefits are payable only to the survivors of employees who have retired before death and are otherwise entitled to an annuity. The surviving spouse of an employee over 65 who dies while still in service has been held not to be eligible for a death benefit. There are those who would place a different interpretation upon the language; and a clear phrasing would be desirable. It is clear that the survivors of employees who die before completing 30 years of service or attainment of age 65 are not eligible for death benefits. It is open to question whether this selection of, in any event, a small group to receive death benefits is calculated to promote best the objectives of the act. The Board is giving further study to this problem.

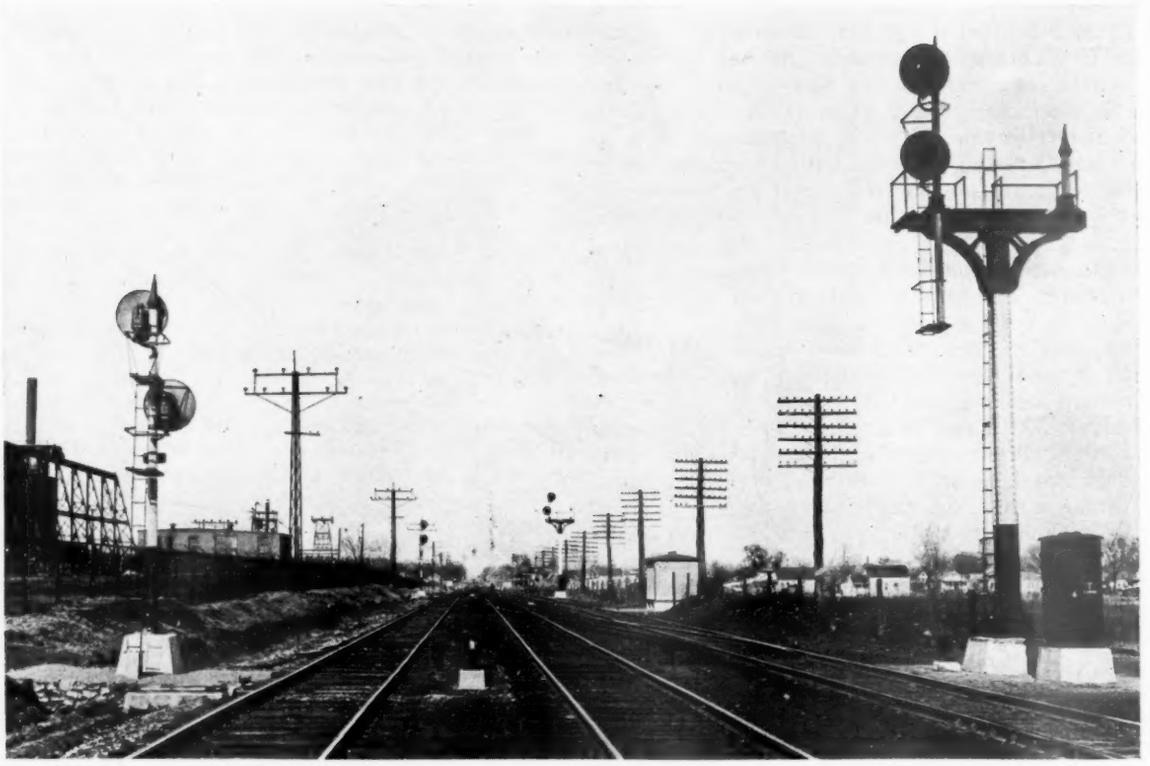
Second, there are certain omissions of a technical character which have nevertheless required administrative action. The act provides for certain reductions in annuities in event of retirement before 65, or continuance in service after that age without an agreement filed with the Board. The reductions are stated in terms of an annual amount; the procedure when the period of time involved is not an exact year needs clarification. Again, the exact method of calculating the average monthly compensation is left to inference. To follow the exact language of the statute would require complete wage and service information on every individual, a frequent impossibility. Obviously there is no intention that employees suffer by reason of the nonexistence of pertinent data, and the Board has had perforce to prescribe by regulation the procedure in such cases. The Board proposes to recommend certain changes in the statute which will ratify its own necessary administrative actions and render such practice unnecessary for the future.

Third, the pendency of litigation has put an unanticipated strain on the statute. Reference has already been made to a reduction in annuity for continuance in service after 65 unless an agreement is filed with the Board. This agreement between the carrier and the individual employee may run for a period not to exceed 1 year and may be extended each year, but not beyond the age of 70. Persons holding official positions in the service of a carrier and employee representatives are not subject to the reduction and need not file agreements.

The carriers for the most part have refused to enter into these agreements. With the approval of the General Accounting Office, the Board has been able to work out a procedure to meet the requirements of the statute. But, while widespread publicity was given to the regulation embodying the procedure, not all those affected have learned about it.

Because of the litigation, many employees who would have otherwise retired have delayed. Several thousand employees past the age of 70 are among this group. The Board appreciates their apprehension. It is not believed that the aims of the legis-

(*Continued on page 440*)



General View of North Gate Looking North

Delaware & Hudson Installs Centralized Traffic Control

Project on 6. 6 miles of double track includes control of four layouts where interlockings were replaced

THE Delaware & Hudson has recently completed the installation of centralized traffic control on 6.6 miles of multiple-track in the terminal district between Watervliet, N. Y., and Albany, this installation, as measured by equipment controlled, being one of the largest C.T.C. projects constructed to date, involving the control of 38 switches, 2 derails and 56 signals. The Albany-to-Watervliet territory is a portion of the main line northward from Albany to Rouses Point, N. Y., on the route to Montreal, Que. The daily traffic in this territory includes 16 regular passenger trains and 13 trains with passenger equipment operating between the coach yard at SG and the terminal at Albany. In addition, approximately 300 switching, interchange, and locomotive movements are made daily to and from shops at SG.

The C.T.C. replaces four interlockings as well as hand-throw switches at two outlying crossovers, formerly handled by train crews. The operation of the switches at all of these layouts, as well as the signals for directing train movements, is under the control of the operator of the C.T.C. machine located in the chief dispatcher's office at Albany.

From the Livingston Avenue interlocking, located 2,000 ft. north of the station at Albany, the double-track main line extends through on the lower level of the station, while a double track line branches off and connects with New York Central tracks in the upper level of the station layout. A single-track line of the New York central crosses all four of the main tracks mentioned above, and the Livingston Avenue plant also includes two double-slip switches as well as single switches and crossovers, as may be seen from the track plan. A low-pressure pneumatic interlocking of the early type, using air pressure for the control as well as the operation of the switches and signals, was installed at this layout by the Pneumatic Signal Company in 1902. Although the plant has rendered good service from the time of its installation, during recent years it has been almost impossible to buy repair parts, and such parts as were needed have had to be made practically by hand. As most of the apparatus was in need of replacement, it was decided to remove the entire interlocking and to install new electric switch machines and signals which would form a part of the new C.T.C. system.

At Thatcher street, 3,700 ft. north of the Albany station, there is a crossover between the main tracks and a crossover from Track 1 to a yard switch lead, this layout being used numerous times daily by switch engines

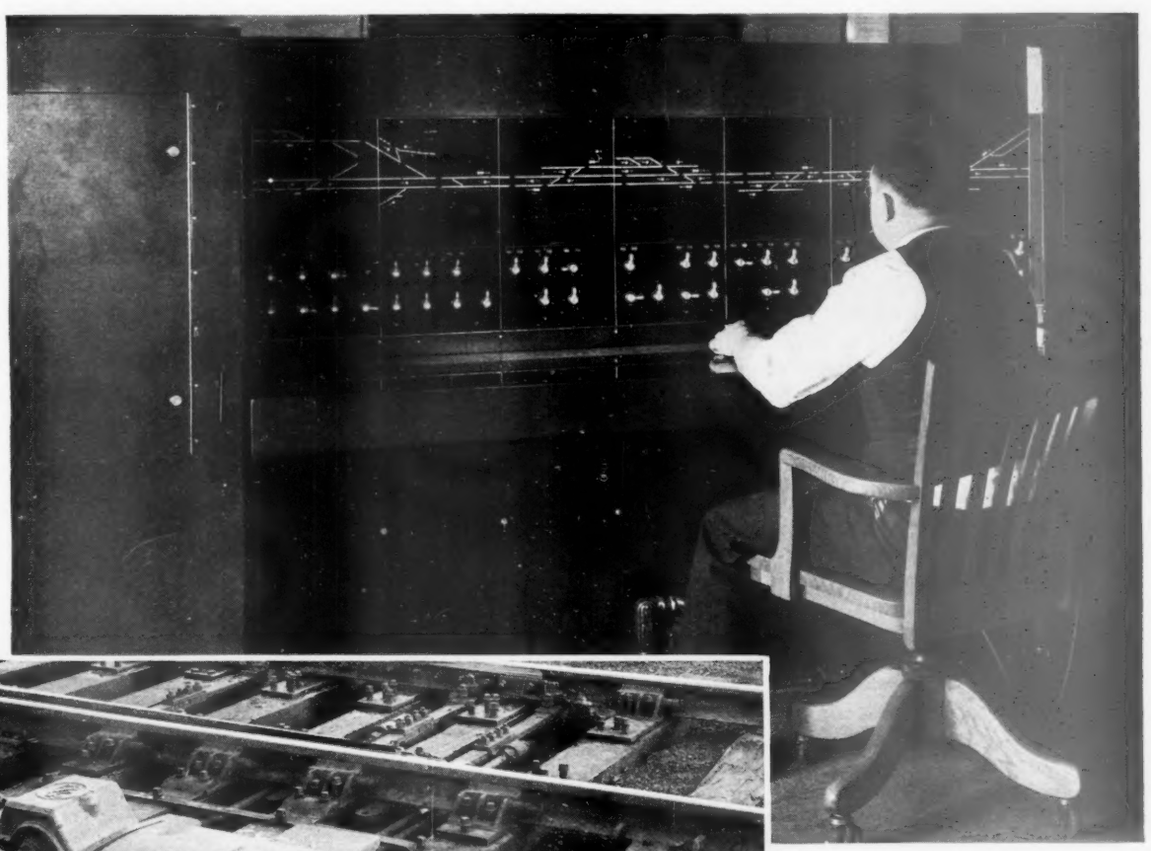
serving various industries. Years ago there was a mechanical interlocking at this layout, but in more recent years the switches have been hand-operated by train crews. In order to facilitate train movements and afford reliable protection, power switch machines were installed at the switches of these crossovers, and the switches, together with complete signaling of the layout, now form a part of the C.T.C. project.

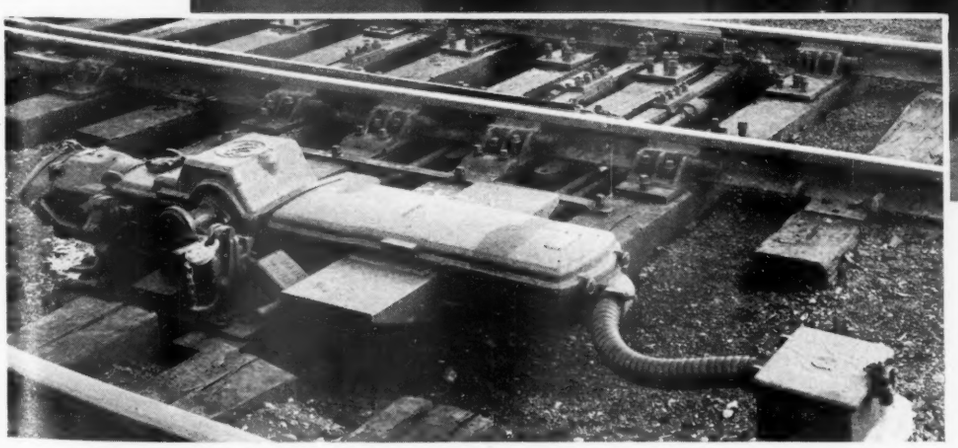
The connection from the double-track main line to the south end of the freight and passenger yards and repair shops is located at SG, South Gate, about 4.3 miles north of Albany. A mechanical interlocking with 30 working levers had been in service at this junction since 1918. A side track, used principally for northward trains entering the yard, extended from SG southward along the east side of the main line for 2,600 ft. At the time this interlocking was placed in service, an electric switch machine and controlled signals were installed at the outlying switch and remotely controlled from the tower. This was one of the early remote control projects, and at the time it was installed, the control of a switch 2,600 ft. from the tower was considered to be quite an advance in the signal art.

As the number of train movements in and out of the yard at this time do not justify the switch at the south end, it was removed and the crossovers between the main tracks and between the northward main track and the yard track near SG tower were relocated. This left two crossovers and two yard-lead switches to be equipped with electric switch machines at this layout, in order to include it in the C.T.C. project, and thus permit the removal of the entire mechanical interlocking at SG.

The connection from the double-track main line to the north end of the yards at Colonie is located at NG, North Gate, which is 5,080 ft. north of South Gate. In a cabin at the NG layout, there was a 4-lever mechanical interlocking frame for the operation of the switches and 3 G.R.S. desk-type electric levers for control of the signals. Power switch machines and new signals, all controlled as a part of the new C.T.C. system, were installed to replace the interlocking at NG.

At WX, Watervliet, 6.6 miles north of Albany, a double-track line branched off to the east, extending across the Hudson river to Troy, N. Y. A second junction of this Troy line with the double-track main line is so arranged as to form a wye layout. All of the switches and signals in the entire wye arrangement had been operated and controlled by a 52-lever G.R.S. electric interlocking, which had been in service since 1904. At the time the wye layout and interlocking were constructed, 33 years ago, passenger trains were operated at 30-min. intervals in each direction between Albany and Troy. With the development of highways and new bridges, this service has been eliminated and only one passenger train is now operated between Troy and Albany. Passenger trains operating between New York and Montreal are received from the New York Central at Troy, and are operated through the second junction of the





Above—The New Panel Type C. T. C. Machine at Albany. Left —The Power Switch Machines Are the Dual-Control Type

wye. Therefore, it was practicable to simplify the track arrangement, using single track around the wye, and removing a number of the switches and signals. These changes reduced the layout to five single switches and three crossovers, making it practicable to control the switches and signals as a part of the C.T.C. project.

New Type Control Machine

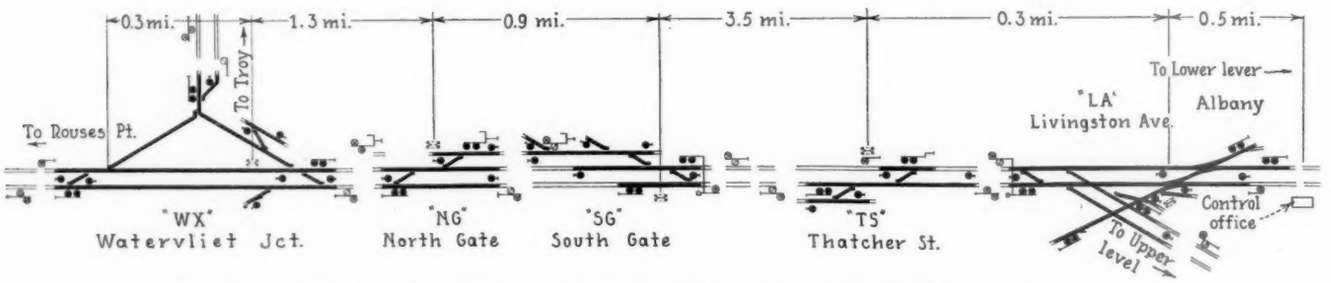
The C.T.C. control machine in the dispatcher's office at Albany controls the switches at all the five layouts detailed above, as well as the signals to direct train movements by signal indication in either direction on either track between Thatcher street and Livingston avenue. This control machine is constructed according to a new unit-panel type design developed by the General Railway Signal Company. On the face of the machine, the track diagram and levers for the control of field functions in one general locality are assembled on one panel 10 in. wide and 18 in. high. The coding equipment operating in connection with the switches and signals controlled by a panel is arranged in a case the same width as the panel, the case being so constructed that it can be pulled out to the rear of the machine for inspection. With this type of construction, the machine is made up of a series of units which are fitted together to form a compact machine. When changes or additions are made to the C.T.C. system, additional units can be inserted at any point or added at either end as required, without changing existing units.

This control machine now has 19 levers for the control of 56 signals, and 24 levers for the control of 38 switches and 2 derails. The levers are arranged in two rows on the lower portion of the vertical panel of the machine, the signal levers being in the top row and the switch levers at the bottom. A track and signal diagram extends across the panel above the levers, small lamps in the track diagram indicating the position of trains on main tracks throughout the entire controlled area.

When in the normal position, all levers point upward. The majority of the signal levers control signals for two directions of traffic, the lever being turned 90 deg. to the right to control southward signals and 90 deg. to the left to control northward signals. Small indicator lamps just above the signal levers have an enclosed arrow and are lighted when the signal controlled by the lever indicates proceed. The switch levers, located in a row just below the signal levers, are turned 90 deg. to the right to reverse the corresponding switch. A small lamp in the face of each switch lever is lighted from the time the lever is moved until the switch machine for the respective switch has operated and locked up in the position corresponding to that of the lever. In other words, this is an out-of-correspondence indication. When making a line-up, the operator positions the switch and signal lever and then pushes the button below the two levers. This action causes the control code to be sent out on the line. The control of the switches and signals, as well as the return of indications to the machine, is all accomplished by the G.R.S. code system.

Outside Construction

In the vicinity of each group of power switches and signals, a welded sheet-metal cabin is provided for housing the relays, coding apparatus, battery and charging apparatus. Wires and cables coming into the houses are terminated on terminals or arresters mounted on a panel at one end of the cabin. The major portion of the insulated wire and cable in this installation is of Kerite manufacture, the underground cable being equipped with mummy type protective covering including no lead sheath or metal tape. General Electric carbon-gap arresters are used.



Heavy Track Lines Indicate Layouts Where Switches and Signals Are Controlled from C. T. C. Machine

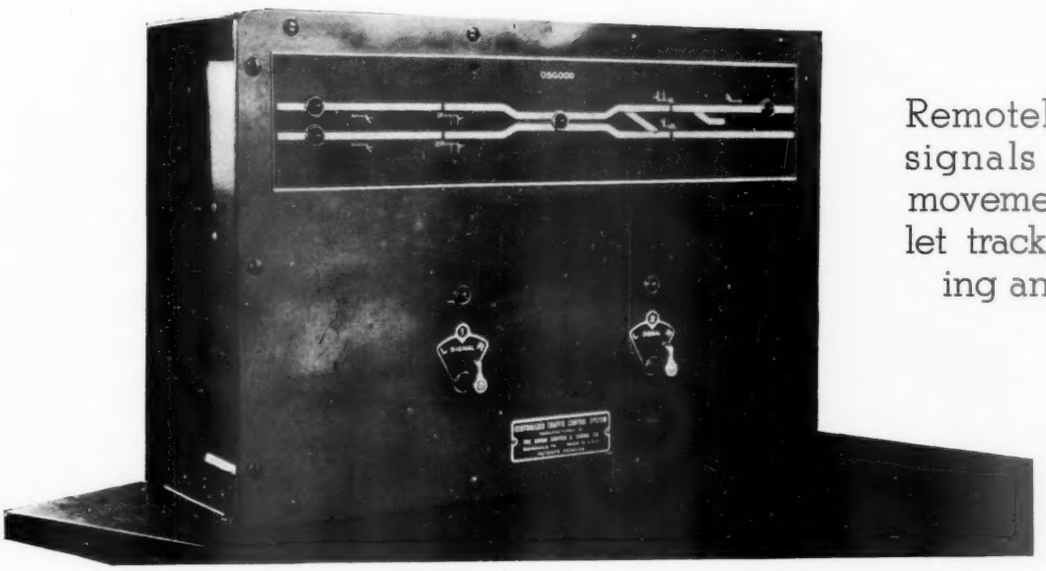
The first section of the installation at WX was placed in service on October 15, 1936, the other sections being cut in to service as completed, the entire project being placed in full service on February 28. The C.T.C. has given satisfactory service, train operations have been expedited, operating expenses have been reduced by the elimination of the positions held by nine telegraphers and three switchmen and the expense of heat, light and maintenance of tower buildings, and a reduction has been made in signal maintenance and operation.

All the major items of equipment were furnished by the General Railway Signal Company, and the construction was handled by the Delaware & Hudson signal forces, supervised by A. Vallee, supervisor of signal construction, and C. M. Acker, signal supervisor, under the direction of A. H. Rice, signal engineer.

* * *

The Canadian National's "International Limited"

Gauntlet Signals on the B. & L. E.



Remotely controlled signals direct train movements on gauntlet track, thus replacing an interlocking

IN 1902, the Bessemer & Lake Erie constructed a single-track low-grade line 8.9 miles long around the east side of Greenville, Pa., from KO Tower to KY Tower, this new line being shorter and having much better grades than the original line which passes through the main section of the city at a level 125 ft. lower than the freight line. In 1917, a second track was added on this freight line except at a viaduct 1,724 ft. long, 3.5 miles north of Greenville, crossing the Little Shenango river and the track of the Erie and the New York Central, as well as the old main line of the Bessemer & Lake Erie. Here the second track was gauntleted with the original track, because of the expense of reconstructing the viaduct. Including both approaches, the length of the gauntlet between points of standard track clearance is 2,724 ft.

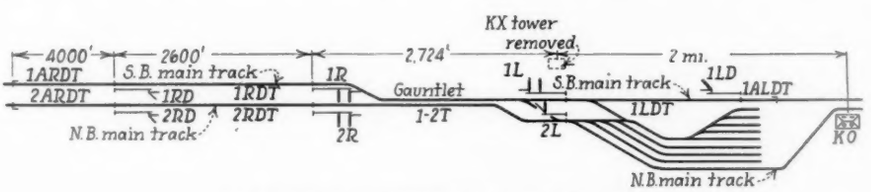
To direct train movements over this gauntlet track, a mechanical interlocking, known as KX Tower, had been installed years ago at the clearance point at the north end of the viaduct. This interlocking machine had six levers to control mechanical signals on both tracks at KX and to control electric signals on both tracks at the south end of the viaduct. A leverman was on duty each trick. During the early period of the depression, this interlocking was taken out of service, as a means of reducing operating expenses, and the entire plant, together with the signals at the south end, were dismantled, after which time train movements were directed by train orders.

The traffic on this line varies from four to eight trains each way daily, depending on the day of the week and the season of the year. The northward traffic consists of manufactured steel products and coal from the Pittsburgh district, moving to connections or to docks at Conneaut Harbor. Southward traffic consists of manufactured products, and, especially during the navigation season, of iron ore which is moved in large quantities from the docks at Conneaut Harbor to Pittsburgh. Each train handled up to 125 loaded cars, about 7,400 net tons. All freight trains are operated as extras.

As traffic increased in the latter part of 1935, it was evident that numerous train stops and delays were resulting from the protecting of train movements over the gauntlet track by train orders. These train orders had to be set up in advance, and it was impossible to determine the exact time at which trains would approach the gauntlet track, with the result that some trains were required to stop unnecessarily.

In order to correct this condition, it was decided that train movements should be directed over the gauntlet by signal indication, independent of train orders. While it would have been possible to control the signals automatically by track circuits, using circuits practically the same as for an automatic interlocking at a crossing of two single-track lines, it was highly desirable that preference be given to southbound trains which, at this location, are ascending an 0.6 per cent grade. To meet this requirement, a semi-automatic control arrangement was provided by means of which the signals are controlled not only by track circuits in the gauntlet section, but also manually by levers in a small desk-type machine on the operator's desk in KO Tower, two miles north of the viaduct. The signaling for directing train movements over the gauntlet track is, therefore, in effect, a remotely-controlled interlocking.

The home signals at each end of the gauntlet track are located opposite the clearance points. Normally,



Track and Signal Plan of Gauntlet Signaling

Train Movements Over the Gauntlet Are Directed by Signal Indication

trains are operated right-hand, although a considerable number of trains are run northward on the southward track. Therefore, it was decided that standard high interlocking home signals should be provided for these three routes, these signals being numbered 1L, 2R and 1R on the plan. Each of these signals has two "arms," the top unit being of the searchlight type, to display red for "stop" and green for "proceed," the standard aspect for a home interlocking signal being completed by the lower arm which is a constant-burning red light. Located at braking distance in approach to each of these three home signals is a high distant signal, using a searchlight unit normally displaying yellow for "caution" and green for "clear." The fourth possible route over the gauntlet, that is, a southward movement on the northward track, is seldom used and a dwarf signal was considered adequate. This signal is a searchlight unit operating to display red normally for "stop" and yellow for "proceed."

The control machine on the operator's desk in KO Tower has two levers, together with an illuminated track and signal diagram. Lights in the track diagram indicate the position of trains when occupying the gauntlet section between the home signals or any of the three approach sections. The two levers are left normally in the center position, causing all signals to display their most restrictive aspects. Lever No. 1 controls the signals for directing trains in either direction on track SB, being thrown to the left to clear signal 1L to direct a southbound train on the normally southward track SB; and being thrown to the right to cause signal 1R to clear to direct a northbound train to use the southward track SB. Lever No. 2 controls the signals for train movements in either direction on northward track NB. This lever, when thrown to the right, clears signal 2R for a northbound train on the northward track NB, and to the left to clear signal 2L for a southbound train on the northward track. When the signal controlled displays the proceed aspect, this fact is indicated to the operator by the illumination of the small indication lamp over the lever.

The levers are of the miniature type and are not interlocked, but interlocking is accomplished electrically by interconnection of circuits so that signals for conflicting routes cannot clear. In addition to the control of the signals effected by the levers, all home signals are track-circuit controlled so that these signals indicate stop at all times when the track circuit over the gauntlet section is occupied. Approach locking is accomplished by time-element relays so that if the operator lines up a route for a train which has occupied its approach section and he then places the signal to stop, a period long enough to permit the train to be stopped must elapse before any other signal can be cleared.

The control of the signals and the return of indications to the machine is accomplished by the direct-wire system, using five line wires between the signal layout and the KO Tower.

This installation was designed and installed by the Union Switch & Signal Company, under the jurisdiction of F. R. Layng, chief engineer of the Bessemer & Lake Erie. The concrete foundations for the signals and instrument cases were precast in the factory and, on arrival at the location, were set in place by a power derrick. The instrument cases, made of welded sheet iron, were wired up complete with instruments in place at the Union Company's factory. All underground wiring is in Okonite cable.

Normally the signal lamps are fed from an a-c. supply, but in case of a power outage, these lamps are fed from sets of Edison storage battery which are used normally for feeding control circuits. Sets of Edison primary battery are used to feed the track circuits and the distant signals, as well as the control circuits and indication lamps at the control machine.

Retirement Board Report

(*Continued from page 435*)

lation would be served by enforcing these penalties in respect of service rendered while uncertainties prevail, and the Board recommends that the reductions be applied for service after 70 beginning after the final disposition of the litigation. Experience indicates that no good purpose is served by the requirement that agreements to continue in service be filed between the ages of 65 and 70. The employee is always free to retire and the carrier is always free to enforce retirement whether or not the agreement is filed. The Board recommends, therefore, that this requirement be eliminated from the statute.

Fourth, experience with actual administration has shown that the need for examining records going back almost 50 years imposes a most burdensome task. Few railroad employees can give their employment history in the detail imposed by statutory necessities; and, even where this is done, verification of the detail is necessary. There are a variety of ways in which the laborious assembly of detailed data can be avoided. Each course, however, has a large number of ramifications and the Board does not feel it safe to make recommendations without further experience. That some simplification is necessary for satisfactory operation is clear and the Board's staff will continue intensive studies looking to recommendations at the earliest practicable moment.

Railroads Organize for "Perfect Shipping" Month

Directing nation-wide attention to loss and damage will bring present and future returns

PREPARATIONS for "Perfect Shipping" Month—April, are already well under way and the campaign of the National Association of Regional Advisory Boards, with the co-operation of the railways, promises not only to show results for April but to bring about improvements in the methods of packing, loading and transporting freight which will reduce loss and damage in the future. General plans, arranged by the management and publicity committees, provide for the dissemination of information by railroads and shippers which will stimulate interest and encourage perfect shipping, the mediums being the press, addresses by railway officers and shippers and instructive placards posted in freight stations and shipping rooms.

In addition to these general activities, individual railroads and shippers have already started supplementary programs. On the Chicago, Burlington & Quincy for example, each transportation inspector is contacting every trucker and stowman in his territory individually to make certain that all freight-handling employees will make special efforts to assist in the campaign. The Railway Express Agency likewise will conduct a vigorous drive among its employees in an effort to stimulate interest in careful handling. A special publication is planned, devoted entirely to the drive, while its monthly magazine, the Express Messenger, and its sales promotion material, Selling, will feature Perfect Shipping Month. All inspection and exception reports issued on April traffic will be reviewed by operating superintendents and analyzed by headquarters so that operating deficiencies can be corrected and valuable suggestions forwarded to shippers.

Both Shipper and Carrier to Benefit

The shipper, the railroad and the consignee will each benefit by the campaign, not only during the campaign but later. On the railroad side, a reduction in claim payments, which totalled about $21,000,000 in 1936, means an increase in operating income, while elimination of loss and damage and the resulting inconvenience to shippers means satisfied customers. Shippers on the other hand have taken the position that while the amount of claims paid each year by the railroads is substantial, it represents only a small part of the economic loss that results to industry from loss and damage to freight.

The Shipper's Driver Dropped These Packages

A Knotty Slat in a Shipper's Crate Failed in Transit

A further stimulus to reduce loss and damage is the threat of regulation growing out of claims on fresh fruits and vegetables, which amount to 36 per cent of the entire claim account. The Federal Trade Commission, in its report to Congress on February 1, said that while a considerable portion of the claims on fresh fruits and vegetables is justified, many claims are said to have little or no real basis and payment is due chiefly to fear of traffic reprisals. The commission believes that the only adequate remedy for correcting abuses will not depend on the carriers or the trade and recommends that the Interstate Commerce Commission be given control over payments and inspection, a practice which would work to the disadvantage of the railroads and the shippers.

Railroad Responsibility

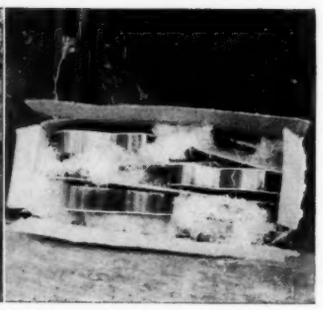
Freight is lost or damaged because of specific causes traceable to both shipper and railroad. About 50 per cent of the damage is due to personnel and can be avoided. Either shippers do not provide containers which will withstand normal shocks, do not handle freight to avoid damage and do not load freight in cars so that it will stand up during the movement of the car, or railroads handle cars so roughly that proper containers and loading cannot withstand the excessive shocks resulting, furnish defective equipment which damages the lading, delay shipments and fail to maintain proper temperatures. Wrecks and fires, for which railroads may or may not be responsible, also contribute to loss and damage. In the case of l.c.l. freight even greater responsibility rests with the railroads, since handling, loading and unloading at freight stations are done by railroad forces.

Drastic reductions in claim payments would result if shippers would use stronger containers and load cars

Freight Prevented from Falling from Truck by a $4.20 Crate

Blocks Used to Prevent Objects Placed Against the Wall from Tipping or Moving

Mattresses Poorly Protected by a Shipper



Guitar Cases Poorly Packed in a Weak Container

properly, but at the same time improvements in the switching of cars and the handling of freight by the railroads would not only reduce claims but would react to the advantage of railroads in other ways. For example, at several gateways, one midwestern city in particular, cars are handled so roughly that some shippers are routing their traffic over other lines so as to avoid the yards in these cities. One innocent railroad, in order to protect its reputation and keep its business, has placed 45 impact recorders at the disposal of shippers so that the latter may determine on which lines damage occurs.

Although in the last 11 years no serious damage to persons and property has ever occurred in the handling of explosives, rising claims during recent months, now averaging one car a week, suggest the need for more careful handling of cars. Cars often contain as much as 40,000 lb. of dynamite or powder, and occasionally cars arrive with many boxes crushed and dynamite sticks or powder strewn on the floor, due to rough handling of cars. In one instance a car was "kicked" at a speed of 12 m.p.h., or 7 m.p.h. in excess of the safe speed. Rules for the handling of explosives guard against their ignition and in this connection it is interesting to note that an engineman, after 20 years of service, learned for the first time that it is unlawful to handle a car of explosives without another car separating it from the locomotive.

Another item in the claim account demanding immediate attention is loss. The almost universal use of paper containers instead of wooden boxes has reduced pilferage, since a broken end-seal is readily noticed and the theft detected, but the loss of entire packages continues to remain high. In view of the fact that claim payments due to the loss of entire packages on one railroad rose only two per cent in 1936, while those on all railroads increased 28 per cent, there appears to be a need for more adequate policing during the handling of freight.

The handling and loading of freight are two more important activities in loss and damage. Much damage classed as unlocated can be traced to freight handlers.

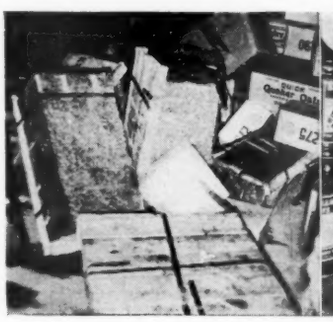
Loaders Failed to "Level Off"

A Shipper Failed to Regard His Own Caution Marks

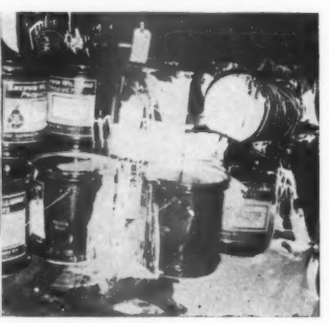
In one freight station one man instead of two handles enameled ranges, his method being to slide the range off the truck and let it fall about eight inches, with the possibility of damage. In view of the growing porcelain enamel tonnage, which in 1936 amounted to 1,650,000 units, of which about 1,300,000 units were gas ranges with a wholesale value of $50,000,000, there is a definite need for handling instructions and supervision.

In the same manner improper loading can be traced to violations of standard rules. Among these violations which can also be corrected by instructions and supervision are: Failure to observe caution marks, such as fragile and this side up; light, breakable merchandise mixed with rough freight, which causes punctured and crushed cartons and crates; pipe and bed rails loaded so that they can shift into crates; permitting damaged crates and cartons to go forward without recoopering; and failure to "break down" and level off loads before forwarding.

With the introduction of pick up and delivery service, forwarding companies and fast freight service, new problems have arisen which seriously affect the claim account. One of these problems is the late arrival of freight at stations and the loss and damage caused by the inability



Large Granite Blocks Loaded with Quaker Oats



Barrels Loaded on Bilge Crushed the Paint Drums

of forces to handle and load freight properly before train departures. Forwarding companies and truckers, including those of the railways, in almost all large cities keep their trucks on the street until full loads are secured, and as a result freight station forces, in the haste to clear the stations, become negligent in handling and loading. One station in Chicago, for example, is often called upon to handle as many as 45 truck loads of freight between 4:30 p. m. and 5 p. m., the closing time. In connection with this situation, a complaint made by a forwarding company that its trucks were delayed unnecessarily at a freight station because of congestion is interesting. Investigation showed that the railroad was unloading the forwarding company's trucks and trailers faster than that company could remove them, with the result that the forwarding company's own trucks and trailers were interfering with its own operations. With the inability of freight station forces to perform properly under these conditions, freight is often checked and accepted without being seen, often damaged by too rapid handling and dumped rather than loaded into cars.

ONE SCHOLARSHIP TO THE COLLEGE OF ENGINEERING or College of Arts and Science at McGill university is being offered by the Canadian Pacific to the winner of a competitive examination among apprentices and other male employees under 21 years of age, enrolled on the permanent staff of the company, and to minor sons of employees. The company maintains 10 scholarships at this university, the new one being to fill a vacancy resulting from the graduation of the previous winner.

Increased Material Prices Boost Railway Inventories

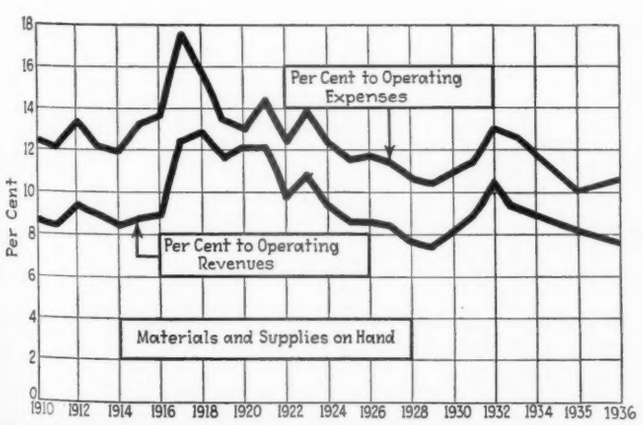
Material and supply balances for 1936 are $28,000,000 higher than for 1935—Some reductions

THAT the railroads are facing a rising tide of inventory values contingent upon rapidly increasing cost of materials, the slowing up of deliveries and increasing requirements for supplies, is reflected by the reports made by them to the Interstate Commerce Commission regarding their investment in materials and supplies on hand on December 31, 1936.

Based on reports from carriers operating 98 per cent of the Class I mileage, the railroads of the United States (Class I, Class II and Class III) began the year 1937 with $319,000,000 of materials and supplies on hand, as compared with $290,751,000 on January 1, 1936—a net increase of $28,000,000, or 9.9 per cent. Totals in both instances represent materials in stock at their original cost to the railroads. If railway inventories were adjusted currently on the basis of market values, the differences between the totals at the close of 1936 and of 1935 would be increased by the full amount of increases made in material costs since 1935.

Table I—Materials and Supplies on Hand—United States Railroads

	Amount	Reduction	Per cent of op. rev.	Per cent of op. exp.
June 30, 1911.....	$244,932,000	$	8.6	12.4
June 30, 1912.....	246,790,000	+ 1,858,000	8.5	12.1
June 30, 1913.....	300,601,000	+ 53,811,000	9.4	13.4
June 30, 1914.....	278,940,000	21,661,000	8.9	12.2
June 30, 1915.....	248,888,000	30,052,000	8.4	11.9
Dec. 31, 1916.....	333,361,000	+ 84,473,000	9.0	13.7
Dec. 31, 1917.....	514,051,000	+180,690,000	12.5	17.6
Dec. 31, 1918.....	641,759,000	+127,708,000	12.9	15.8
Dec. 31, 1919.....	608,527,000	33,232,000	11.6	13.5
Dec. 31, 1920.....	767,267,000	+158,740,000	12.1	12.9
Dec. 31, 1921.....	676,125,000	91,142,000	12.0	14.4
Dec. 31, 1922.....	556,260,000	119,865,000	9.7	12.3
Dec. 31, 1923.....	693,078,000	+136,818,000	10.8	13.9
Dec. 31, 1924.....	569,690,000	123,388,000	9.4	12.3
Dec. 31, 1925.....	535,126,000	34,564,000	8.6	11.5
Dec. 31, 1926.....	561,007,000	+ 25,881,000	8.6	11.8
Dec. 31, 1927.....	532,063,000	28,944,000	8.5	11.4
Dec. 31, 1928.....	478,625,000	53,438,000	7.7	10.6
Dec. 31, 1929.....	477,051,000	1,574,000	7.5	10.4
Dec. 31, 1930.....	437,375,000	39,676,000	8.2	11.0
Dec. 31, 1931.....	379,992,000	57,383,000	8.9	11.5
Dec. 31, 1932.....	321,595,000	58,397,000	10.8	13.1
Dec. 31, 1933.....	296,069,000	25,526,000	9.3	12.9
Dec. 31, 1934.....	302,346,000	+ 6,277,000	9.1	12.2
Dec. 31, 1935.....	290,751,000	11,595,000	8.2	10.8
Dec. 31, 1936.....	319,000,000	+ 28,249,000	7.6	10.5



Relation of Annual Inventories of All Railroads at the End of Each Year to the Corresponding Annual Operating Expenses and Annual Operating Revenues

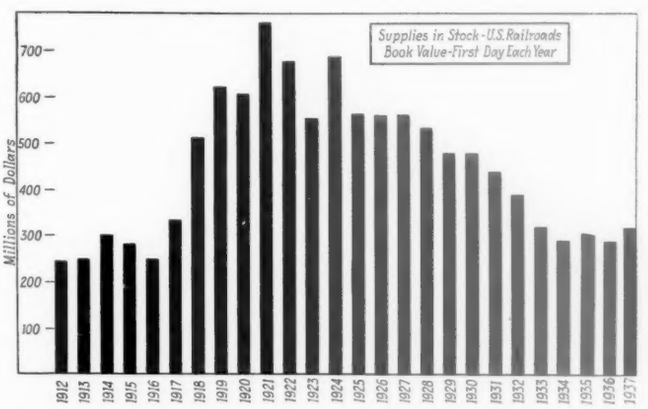


Chart Showing Total Book Value of Materials and Supplies on Hand on All Railroads on the First of Each Year

The gross inventory on December 31, 1936, as reported by the railroads, was the largest investment in unapplied materials since December 31, 1932, when the total was $321,595,000. Except for the last three years, however, total inventories, dollar per dollar, were lower at the beginning of this year than in any year since 1916, and they were $448,000,000 lower than the inventory in 1920. The gross amount on hand December 31, 1936, was equivalent to about $1,327 per mile of road operated, as compared with approximately $1,200 per mile in 1935, and it was equal to 7.6 per cent of the annual operating revenues in 1936, as compared with 8.2 per cent in 1935, while the ratio to annual operating expenses was 10.6 per cent, as compared with 10.8 per cent in 1935.

Comparisons between the amount of material in stock on December 31, 1936, and the average material consumption are not yet available in complete form and will be published in a later issue with statistics showing, in comparative form, the subdivisions of each railroad's inventory figures. The increase in total inventories, however, clearly reflects the higher prices which the railroads are now paying for materials and the slowing up in the deliveries of materials ordered from manufacturers, as well as the increase in the volume of repair work being done by the railroads. At the same time, the net increase in the annual inventories of all the railroads was not as much as might be expected. In money value, the total stocks were less by $158,000,000, or 32 per cent, than in 1929, and their ratio to annual operating expenses and to operating revenues was the lowest in 16 years, with the possible exception of 1929.

Total materials and supplies on hand on December 31, 1936, as reported by each railroad to the I. C. C.,

and the per cent increase or decrease from the previous annual inventory, are given in a table. To facilitate comparisons, the figures have been grouped on a regional basis. However, no attempt was made to consolidate inventories of the reporting companies, as where the stocks are controlled by one management, if not physically combined and interchangeable.

Increases General

The capital tied up in materials and supplies on January 1, 1937, was smaller on 47 roads and larger on 74 railroads than at the beginning of 1936. There was a reduction of $1,322,000, or 9.9 per cent, in the total inventory of the New England region, and a reduction of $611,000, or 5 per cent, in the total inventory of the Pocahontas region, but the combined inventories on December 31, 1936, was larger than on December 31, 1935, in the other regions. It was larger by $2,388,000, or 5.3 per cent, in the Great Lakes region; by $7,226,000, or 15.2 per cent, in the Central Eastern region; by $2,414,000, or 7 per cent, in the Southern region; by $5,407,000, or 15.4 per cent, in the Northwestern region; and by $10,775,000, or 15.5 per cent, in the Central Western region. The increase of the combined inventories in the Southwestern region was $1,378,000, or 6 per cent.

There was a reduction of 12.3 per cent in the inventory reported by the Boston & Maine; a reduction of 10.4 per cent in the Central Vermont inventory; and a reduction of 12.5 per cent in the reported inventory of the New York, New Haven & Hartford. There was a reduction of 6.2 per cent on the Lehigh Valley; 19.9 per cent on the Monongahela; 10.3 per cent on the Montour; 19.8 per cent on the New York, Susquehanna & Western; 25 per cent on the Clinchfield; 20 per cent on the Green Bay & Western; and a reduction of 55.7 per cent in the reported figures of the Alton, and 19.7 per cent on the Missouri-Kansas-Texas; but reductions were the exception. The book value of materials and supplies on hand, including fuel, rail, ties, miscellaneous materials and scrap on December 31, 1936, was $1,137,000, or 4.6 per cent on the New York Central; $1,301,000, or 17.1 per cent, on the Baltimore & Ohio; $5,023,000, or 19.5 per cent, on the Pennsylvania; $953,000, or 21.8 per cent, on the Southern; $1,963,000, or 27.1 per cent, on the Chicago & North Western; $885,000, or 13.4 per cent, on the Great Northern; $896,000, or 14.7 per cent, on the Northern Pacific. Inventories were larger by $1,342,000, or 17.6 per cent, on the Chicago, Burlington & Quincy; $2,009,000, or 41.5 per cent, on the Chicago, Rock Island & Pacific; $1,421,000, or 54.6 per cent, on the Denver & Rio Grande Western; and $4,840,000, or 28.8 per cent, on the Union Pacific; while the increases amounted to 24 per cent on the International-Great Northern; 7.3 per cent on the Missouri Pacific; 51.5 per cent on the St. Louis Southwestern; and 10 per cent on the Virginian.

Stocks Per Mile

Inventories on December 31, 1936, were equivalent to $1,844 per mile of road operated in the New England region; $1,771 per mile in the Great Lakes region; $2,195 per mile in the Central Eastern region; $955 per mile of line operated in the Southern region; $876 per mile in the Northwestern region; $1,414 per mile in the Central Western region; $940 per mile in the Southwestern region; and $1,918 per mile of road in the Pocahontas region. The weighed average inventory

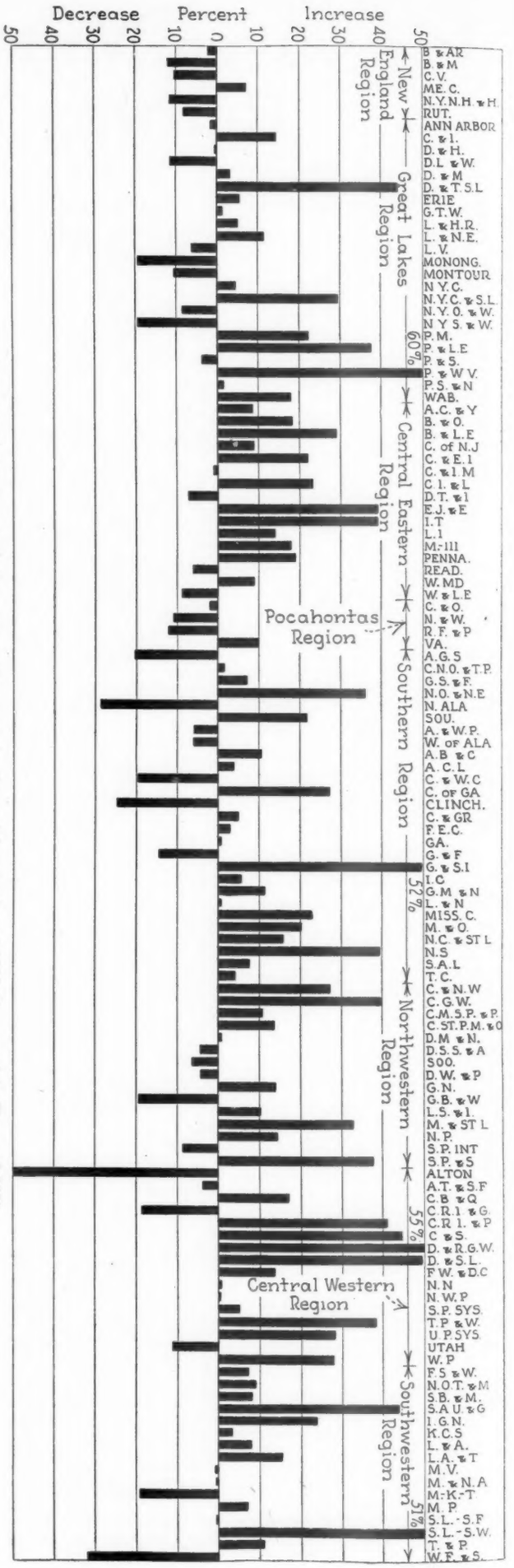


Chart Showing Per Cent Increase or Decrease in Annual Inventories of 1936 Compared to Those of 1935

Materials and Supplies in Stock, December 31, 1936

	Miles operated	Operating expenses	On hand, Dec. 31, 1936	Increase	Per cent increase	On hand per mile 1936	Per cent of op. exp. 1936
Bangor & Aroostook	603	$3,987,773	$810,138	—$17,079	—2.1	1,343	20.3
Boston & Maine	1,989	36,003,613	4,191,940	—587,164	—12.3	2,107	11.6
Central Vermont	454	5,554,949	466,295	—54,434	—10.4	1,027	8.4
Maine Central	1,043	9,251,713	1,258,983	82,868	7.0	1,207	13.6
N Y N H & H	2,045	58,414,779	5,037,384	—720,510	—12.5	2,463	8.6
Rutland	407	3,141,741	298,870	—26,323	—8.1	734	9.5
New England Region	6,541	116,354,568	12,063,610	—1,322,642	—9.9	1,844	11.4
Ann Arbor	293	3,178,959	261,833	—4,306	—1.6	894	8.2
Cambria & Indiana	37	971,225	54,299	6,702	14.1	1,467	5.6
Delaware & Hudson	830	20,602,480	2,200,231	—6,033	—.3	2,651	10.7
Del., Lack. & Western	987	39,184,541	1,694,149	—221,761	—11.6	1,716	4.3
Detroit & Mackinac	242	605,306	187,093	5,866	3.2	773	30.9
Detroit & Toledo Shore Line	50	1,755,642	106,650	32,755	44.3	2,133	6.1
Erie	2,296	58,882,551	3,504,293	18,739	5.4	1,526	5.9
Grand Trunk Western	1,032	18,241,776	1,578,154	25,307	1.6	1,529	8.6
Lehigh & Hudson River	96	1,077,215	82,318	4,110	5.2	857	7.6
Lehigh & New England	219	2,933,614	378,639	39,004	11.5	1,729	12.9
Lehigh Valley	1,332	35,247,646	2,527,244	—168,037	—6.2	1,897	7.2
Monongahela	172	1,822,049	166,197	—41,421	—19.9	966	9.1
Montour	57	1,337,914	132,189	—15,154	—10.3	2,319	9.9
New Jersey & New York	45	865,469	2,816	—2,929	—51.0	62	.3
New York Central	11,216	268,830,436	25,642,047	1,137,944	4.6	2,286	9.5
N. Y. C. & St. L.	1,704	26,637,173	1,443,106	331,067	29.8	847	5.4
N. Y. O. & W.	566	6,583,844	651,013	—62,110	—8.7	1,150	9.9
N. Y. Susque. & West	215	2,440,634	27,791	—6,879	—19.8	129	1.1
Pere Marquette	2,115	23,515,961	1,659,221	306,402	22.6	784	7.1
Pitts. & Lake Erie	233	17,205,608	2,134,594	583,791	37.6	9,161	12.4
Pitts. & Shawmut	102	566,131	99,072	—4,511	—4.3	971	17.5
Pitts. & W. Va.	138	2,692,242	248,518	93,955	60.8	1,801	9.2
Pitts. Shawmut & Nor.	190	902,637	100,175	1,828	1.8	527	11.1
Wabash	2,447	34,334,112	2,251,593	334,352	17.4	920	6.6
Great Lakes Region	26,614	570,415,165	47,133,235	2,388,682	5.3	1,771	8.3
Akron, Canton & Youngstown	171	1,410,703	100,936	8,095	8.7	590	7.2
Baltimore & Ohio	6,485	123,600,333	8,906,940	1,301,326	17.1	1,373	7.2
Bessemer & Lake Erie	225	7,593,566	758,245	168,587	28.6	3,370	9.9
Central of New Jersey	681	23,608,786	1,638,258	136,050	9.0	2,406	6.9
C. & E. I.	931	11,751,140	910,896	169,765	22.9	978	7.7
C. & I. M.	131	2,350,504	262,314	—1,339	—.5	2,002	11.2
C. I. & L.	572	8,150,421	779,093	146,418	23.1	1,362	9.6
D. T. & I.	472	3,850,348	412,230	—27,417	—6.2	873	10.7
E. J. & E.	434	13,118,928	1,020,775	289,853	39.6	2,352	7.8
Illinois Terminal	510	3,760,354	439,832	122,622	38.6	862	11.7
Long Island	396	19,616,193	936,433	116,447	14.2	2,365	4.8
Missouri-Illinois	205	877,899	116,651	17,617	17.7	569	13.3
Pennsylvania	10,379	314,087,701	30,754,758	5,023,135	19.5	2,963	9.8
Penna-Read. S. S. Lines	412	5,538,810	176,573	26,346	17.5	428	3.2
Reading	1,456	40,518,205	4,823,252	—275,295	—5.4	3,313	11.9
Staten Is. Rapid Transit	23	1,621,150	98,999	—17,631	—15.1	4,304	6.1
Western Maryland	882	10,464,047	1,508,250	113,627	8.1	1,710	14.4
Wheeling & Lake Erie	512	10,892,349	972,499	—91,620	—8.6	1,899	8.9
Central Eastern Region	24,877	602,811,437	54,616,934	7,226,586	15.2	2,195	9.1
Alabama Great Southern	315	4,814,550	239,610	—60,719	—20.2	761	4.9
Atlanta & West Point	93	1,532,318	202,077	—11,877	—5.5	2,173	13.2
A. B. & C.	639	3,043,758	341,802	32,349	10.4	535	11.2
Atlantic Coast Line	5,125	33,771,789	2,981,979	117,723	4.1	582	8.8
Central of Georgia	1,926	13,292,495	1,280,928	206,553	19.2	665	9.6
Charleston & Western Carolina	342	1,537,384	151,935	—57,212	—27.3	444	9.9
C. N. O. & T. P.	336	10,058,075	668,240	10,000	1.5	1,989	6.6
Clinchfield	309	3,500,532	427,811	—142,000	—24.9	1,384	12.2
Columbus & Greenville	167	1,037,371	121,794	5,969	5.1	729	11.7
Florida East Coast	705	6,515,854	1,467,272	44,876	3.1	2,081	22.5
Georgia	329	3,009,923	331,328	2,478	.7	1,007	11.0
Georgia & Florida	408	1,096,808	112,883	—19,516	—14.7	277	10.3
Georgia, Sou. & Florida	397	1,949,114	115,690	7,749	7.1	291	5.9
Gulf & Ship Island	259	1,266,503	46,085	24,624	114.7	178	3.6
Gulf, Mobile & Northern	936	4,468,594	411,273	41,673	11.3	439	9.2
Illinois Central & Y. & M. V.	6,592	85,253,995	7,223,532	405,147	5.9	1,096	8.5
Louisville & Nashville	4,986	65,648,761	8,427,789	72,932	.8	1,690	12.8
Mississippi Central	150	717,926	72,939	13,623	23.0	486	10.2
Mobile & Ohio	1,201	8,363,535	907,049	155,518	20.7	755	10.8
N. C. & St. L.	1,150	12,085,360	1,589,573	217,378	15.8	1,382	13.1
N. O. & Northeastern	204	1,831,840	260,064	69,260	36.2	1,275	14.2
Norfolk Southern	834	3,572,888	454,243	127,982	39.2	545	12.7
Northern Alabama	100	412,615	61,727	—24,957	—28.8	617	14.9
Seaboard Air Line	4,307	31,820,609	3,519,346	228,103	6.9	817	11.0
Southern	6,641	67,416,701	5,333,800	953,947	21.8	803	7.9
Tennessee Central	286	1,784,349	184,355	6,569	3.7	644	10.3
Western Ry. of Alabama	133	1,437,682	198,421	—13,325	—6.3	1,491	13.8
Southern Region	38,870	371,241,329	37,133,545	2,414,837	7.0	955	10.0
C. & N. W.	8,353	77,030,000	9,184,336	1,963,258	27.1	1,099	11.9
C. G. W.	1,512	13,217,419	624,525	207,828	49.9	413	4.7
C. M. St. P. & P.	11,125	85,244,354	9,357,998	894,236	10.6	841	11.0
C. St. P. M. & O.	1,648	15,274,935	1,257,497	152,702	13.8	763	8.2
D. M. & N.	536	8,397,387	934,330	5,581	.6	1,743	11.1
D. S. S. & A.	550	2,019,843	284,590	—12,552	—4.2	517	14.1
Duluth, Winnipeg & Pac.	178	1,103,948	246,810	—11,138	—4.3	1,386	22.3
Great Northern	8,188	56,880,722	7,745,171	885,444	13.4	946	13.6
Green Bay & Western	234	1,237,062	198,926	—49,464	—19.9	850	16.1
Lake Superior & Ishpeming	160	1,214,704	351,624	32,325	10.1	2,198	28.9
M. & St. L.	1,570	7,115,442	719,261	179,951	33.3	458	10.1
M. St. P. & S. S. M.	4,296	20,845,049	1,955,769	—119,677	—6.5	455	9.4
Northern Pacific	6,727	48,318,405	6,984,306	896,002	14.7	1,038	14.4
Spokane International	163	581,112	71,411	—6,737	—8.6	438	12.3
S. P. & S.	946	5,460,162	551,321	149,972	37.3	583	10.1
Northwestern Region	46,186	343,940,544	40,467,875	5,407,085	15.4	876	11.8
Alton	956	12,510,609	588,461	—739,926	—55.7	615	4.7
A. T. & S. F.	13,230	125,061,818	16,832,514	—63,943	—.4	1,272	13.4
C. B. & Q.	9,004	71,243,003	8,933,296	1,342,286	17.6	992	12.5
C. R. I. & G.	626	3,152,564	186,522	—41,278	—18.1	298	5.9
C. R. I. & P.	7,564	64,249,209	6,848,128	2,009,759	41.5	905	10.6
Colorado & Southern	988	5,724,299	531,801	240,231	82.3	538	9.3
D. & R. G. W.	2,582	20,938,958	4,022,842	1,421,960	54.6	1,558	19.2
Denver & Salt Lake	232	1,938,668	704,933	352,801	100.0	3,038	36.4
Ft. W. & D. C.	902	4,074,311	612,523	72,760	13.5	679	15.0

Materials and Supplies in Stock, December 31, 1936—Continued

	Miles operated	Operating expenses	On hand Dec. 31, 1936	Increase	Per cent increase	On hand per mile 1936	Per cent of op. exp. 1936
Nevada Northern	165	323,831	96,977	177	.2	588	29.9
Northwestern Pacific	351	3,302,346	189,676	—231	—0	540	5.7
Southern Pacific Sys.	8,772	110,531,464	16,452,448	790,811	5.0	1,875	14.9
Toledo, Peoria & Western	239	1,660,866	325,534	89,952	38.1	1,362	19.6
Union Pacific	9,865	108,728,114	21,638,889	4,840,099	28.8	2,193	19.9
Utah	111	780,431	173,753	—21,432	11.0	1,565	22.3
Western Pacific	1,207	12,886,816	2,198,101	478,194	27.8	1,821	17.0
Central Western Region	56,794	547,107,307	80,336,398	10,775,220	15.5	1,414	14.7
Burlington-Rock Island	255	981,685	41,666	—70,065	—62.7	1,634	4.2
Ft. Smith & Western	249	650,025	173,029	11,474	7.1	695	26.6
Gulf Coast Lines:							
N. O. T. & M.	191	1,562,179	623,749	51,813	9.0	3,265	39.9
St. L. B. & M.	598	4,212,023	385,345	29,927	8.4	644	9.1
S. A. U. & G.	317	941,298	56,312	17,153	43.8	178	6.0
International-Great Northern	1,154	10,190,578	1,837,519	357,242	24.1	1,592	18.0
Kansas City Southern	878	8,726,244	1,133,230	35,694	3.2	1,291	13.0
Kansas, Okla. & Gulf	326	1,169,727	145,542	80,540	123.9	446	12.4
La. & Ark.	606	3,754,705	764,003	58,568	8.3	1,261	20.3
La., Ark. & Texas	255	1,076,570	180,285	24,186	15.5	707	16.7
Midland Valley	354	832,889	123,464	—1,035	—.8	349	14.8
Mo. & Ark.	364	857,479	56,356	—448	—.8	155	6.6
M-K-T	3,293	22,661,701	2,182,619	—535,367	—19.7	663	9.6
Missouri Pacific	7,219	68,232,872	7,062,920	483,607	7.3	978	10.3
Okla. City-Ada-Atoka	132	313,908	9,373	2,062	28.2	71	3.0
St. L.-S. F. Sys.	5,422	40,778,209	4,230,611	—3,447	—.1	780	10.4
St. L. Southwestern	1,766	13,199,346	1,470,990	500,098	51.5	833	11.1
Texas & Pacific	1,949	19,472,453	3,546,964	345,417	10.8	1,820	18.2
Texas Mexican	162	971,485	97,274	5,748	6.3	600	10.0
Wichita Falls & Southern	203	427,185	30,064	—14,503	—32.5	148	7.0
Southwestern Region	25,693	201,012,561	24,151,315	1,378,664	6.0	940	12.0
Chesapeake & Ohio	3,106	70,014,489	3,833,965	—73,840	—1.9	1,234	5.5
Norfolk & Western	2,175	50,147,899	5,350,365	—599,795	—10.8	2,460	10.7
R. F. & P.	117	5,754,395	673,896	—91,405	—11.9	5,760	11.7
Virginian	619	7,865,125	1,685,212	153,493	10.0	2,722	21.4
Pocahontas Region	6,017	133,781,908	11,543,438	—611,547	—5.0	1,918	8.6
GRAND TOTAL—All Roads Reporting.	231,592	2,886,664,819	307,446,350	27,656,885	9.9	1,327	10.6

per mile of road for the United States was $1,327, as compared with $1,200 in 1935.

The ratio of total inventories to annual operating expenses, averaging 10.6 per cent for the United States, was 8.6 per cent for the Pocahontas region; 11.4 per cent in the New England region; 8.3 per cent in the Great Lakes region; 9.1 per cent in the Central Eastern region; 10 per cent in the Southern region; and 14.7 per cent in the Central Western region.

There were 56 roads of the 120 companies reporting whose inventories amounted to less than 10 per cent of their annual operating expenses. The ratio was 4.3 per cent on the Delaware, Lackawanna & Western; 5.9 per cent on the Erie; 7.9 per cent on the Southern; 4.7 per cent on the Chicago Great Western and Alton; and 5.5 per cent on the Chesapeake & Ohio. For comparisons with the corresponding figures for the year 1935, the reader is referred to the issue of *Railway Age* of March 7, 1936.

Full Length Movie Portrays C.P.R. History

A FULL-LENGTH motion picture drama which has as its background the history of the construction of the Canadian Pacific line through the Rockies will be released in this country next week. The film, which is called "Silent Barriers" has a regulation love story plot and is designed to appeal to seasoned cinema addicts, whether they care anything about railroad history or not. However, the play adheres closely to historical fact in its railroad background, which should give the picture high status among efforts toward improved public relation.

The picture was produced in England except for extensive work "on location" in Western Canada. The producer is Gaumont British Pictures, and the film was first released in London a few weeks ago, where it was well received by critics and the public.

During the course of filming in Western Canada—near Revelstoke, B. C.—the company actually laid over 1,000 yd. of track along a mountain side, using antiquated equipment, without benefit of steam shovels or electric drills, but with thousands of shovel-wielding "extras" and tons of dynamite. The film company sent an entire studio crew, a group of actors and complete picture-making equipment to Revelstoke.

In the course of the play, celebrated railroad pioneers of the last century make their appearance—Van Horne, Donald Smith, James J. Hill, and the pathfinder and trail-blazer, Major "Hells Bells" Rogers. The story deals with the re-discovery of Eagle Pass by Major Rogers and his expedition, and the pushing of the railroad through this passage just at a time when the whole project seemed doomed to failure.

The film, in following the actual history of the construction of the road, portrays the classic fight between

A Pioneer Station in a Pioneer Country, as Reconstructed for the Movies

British Movie Actors "On Location" in Western Canada on the C.P.R. Drama "Silent Barriers"

Hill and the Canadian directors, the swallowing of engines and trains by the treacherous muskegs, and the heroic labors of the train crews and construction gangs. The scene representing the driving of the last spike was reproduced from the familiar photograph of this event.

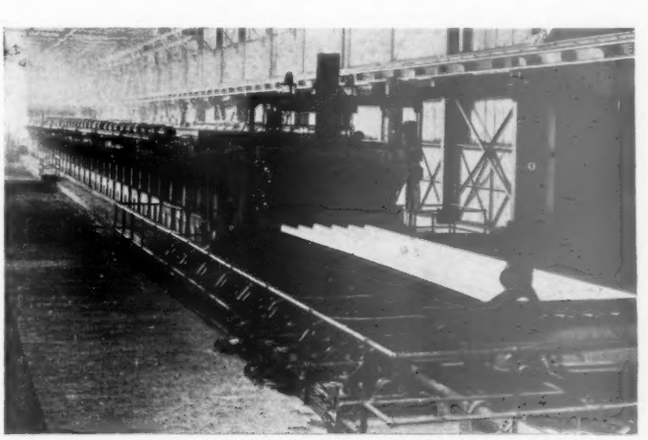
The Canadian Pacific and the Canadian government offered full assistance in the making of the picture. The section gangs were furnished by the road, as was much of the old equipment, supply trains and other transportation accessories. The city of Revelstoke, actual scene of the historic episodes described in the film, was turned over completely to the Gaumont company, which immediately set to work on a set which duplicates the famous railroad town as it looked in the 'Eighties. Six months were spent by the company "on location" at and near Revelstoke.

Gary Plant Equipped To Brunorize Rail

ON March 10, the Carnegie-Illinois Steel Corporation formally placed in service at Gary, Ind., facilities for the "normalizing" of steel rails. This process, or Brunorizing, as it has been named to commemorate the name of John Brunner, late manager, department of metallurgy and inspection of the Illinois Steel Company, who perfected this process, is described as a precisely controlled heat treatment, in which newly rolled rails are heated to above the critical temperature and then cooled in the air. The critical temperature ranges from 1350 to 1400 deg. F., but the rails are heated to a temperature about 100 deg. higher. This heat treatment is said to bring about highly desirable changes in the properties of the steel, among which the most important are: (1) The grains are finer; (2) the stresses in the rail are lessened; (3) the toughness is increased; (4) a condition is set up that favors uniform end-hardening; and (5) the steel may at times have slightly lower hardness and tensile strength, but it always exhibits greatly improved ductility.

The Bru-Nor process involves the use of a gas-fired furnace in which the rails are reheated after they have been allowed to cool on the hot beds to temperatures ranging from 900 to 1100 deg. F. The furnace at Gary is 9 ft. 6 in. wide by 250 ft. long, inside dimensions, and is capable of holding six groups of eight 39-ft. rails at one time. The rails of each group rest, side by side, on alloy-iron rollers that are power operated for the movement of the rails through the furnace in a lengthwise direction. The time required to reheat the rails varies from 18 to 30 min., permitting a new group of six to be introduced into the furnace at intervals of 3 to 5 min. Thus, the furnace has a capacity of 70 gross tons of rail per hour. At each charge all of the groups advance one rail length, and the most advanced group leaves the discharge end of the furnace. However in the intervals between these advances, the rails of all groups are moved back and forth several times a minute by oscillating the rollers a part of a turn. This is done to promote uniform heating and reduces the tendency of the rollers to sag under the weight of the rails.

The furnace is divided into eight zones for the automatic control of the temperature. Fans circulate the hot gases, and recording pyrometers connected with the heat controls regulate the quantity and proportions of coke-oven gas and air. This automatic control is verified manually by observers with optical pyrometers who take the oven temperatures and also the temperatures of the leaving rails. In the regular operation of the furnace



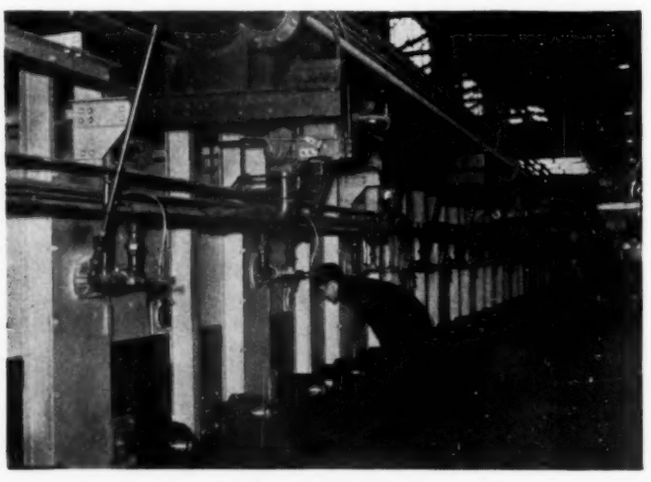
A Charge of Six Rails Emerging From the Furnace

Pyrometer Readings Are Recorded Automatically at This Board

the rails attain the desired temperature by the time that they have traveled half-way through the furnace, and are held at that temperature through the remaining half to insure thorough equalizing of the heat.

The rails are moved from the furnace to cooling beds on a roller table, but as most of the Brunorized rail is bought under terms calling for end hardening, it has been found most convenient to combine the two processes by quenching the ends of the rails for end hardening just as they leave the furnace. Accordingly, the roller table has been arranged to space the rails in alinement with a group of quenching nozzles. When the rails are in the requisite position the nozzles are engaged firmly with the ends of the rails and compressed air is jetted against the rail ends for a predetermined interval of time which is controlled by an electric timing device. This operation is also subject to manual observation under the supervision of the metallurgical department. The final stage in the process comprises the cooling of the rails in air on the cooling beds.

In addition to greater ductility at ordinary temperatures, it is said that the Brunorized rail shows an appreciably greater relative ductility than hot-bed cooled rails at low temperatures. The difference is noticeable at zero F., but is much more pronounced at —50 deg. F. It is also claimed that end hardening that is accomplished by the quenching of rails that have been heated throughout their entire length produces more uniform hardness than is possible where only the ends of the rails are heated, and that the gradation of the hardness from the end of the rail to the unaffected portion is also more uniform.



Progress of Each Charge May Be Noted Through "Peep Holes" in the Side of the Furnace

Tests of installations of Brunorized and end-hardened rail in 32 locations on 23 railways are said to show substantially less batter than rail not so treated, and form the basis for the conclusion that less batter will develop in end-hardened rails when the hardness diminishes gradually to the normal hardness in a distance of three inches.

Odds and Ends . . .

Did You Know?

One standard Pullman car generates for its own use enough electricity to supply four ordinary sized homes.

Marbles

One of the sports in which British railway men excel is that of shooting marbles. Large and elaborate tournaments are held, and the present champion is that famous marksman, 'Big Bert' Bottling, who, when not shooting marbles, is a trainman for the Southern.

Wine Trains

Instead of snow trains or bicycle trains as we operate them over here, the French railways operate wine trains from Paris to the various wine growing centers, so that the connoisseurs may sample the delights of the vintage of the grape at the famous places where it is grown and pressed.

Line-Smashing Superintendent

J. J. Gallagher, recently promoted to superintendent of the North Texas division of the Missouri-Kansas-Texas, on which division he has been division engineer for several years, is probably the only railroad superintendent with an All-American football background. In fact, Gallagher was the first player west of the Mississippi to be selected on Camp's All-American team. He did his playing at the University of Missouri.

Neat Stations

A best-kept-station contest has been turned into a source of revenue by the London & North Eastern. The practice of awarding cash prizes for the best kept stations has been an annual feature on the L. & N. E. for some time. The public became so interested in the project that, last year, more than 20 excursion trains were run to visit several of the stations and inspect the floral displays on the station grounds.

Model Department

One of the most complete miniature railways in the country is owned by M. F. Rheinhardt, Jr., son of a Chesapeake & Ohio freight handler at Washington, D. C. One of the unusual features of this railway is its automatic signal system. The train movements are controlled by 12 high signals and 12 dwarf signals. Three trains may be operated simultaneously, with passage through conflicting routes controlled automatically. Any failure of a signal, track or relay circuit, immediately causes a restrictive indication on the miniature signals.

Progress

Millions of words have been spoken and written about railroads, and among those which linger in the mind are a sentence or two from a speech M. W. Clement, president of the Pennsylvania, made some years ago. He said:

"All I ask you to do is to watch the trains go by and you will say to yourself: 'Without any fuss, without any blowing of horns, here is an exemplification of the progress of American history; a progress just as great as that made by any other industry. Here is an industry—transportation—that has tied this country together from its very birth.'"

Communications and Books . . .

Customer Always Right

MONTREAL, QUE.

TO THE EDITOR:

If, instead of criticizing Mr. Richards' article in your issue of January 30, "See Yourself as Your Passenger Sees You," our trainmen and also "One Conscientious Brakeman" (*Railway Age*, February 27, 1937, page 373) would adopt the suggestions made by Mr. Richards, it would go a long way towards getting travel back to the railways. It will do no good to show the traveling public it is wrong, and any suggestions or criticisms made by passengers should be given every consideration by the railway managements, since, if the public is not satisfied with rail travel, other means of transportation will be found.

INTERESTED.

Segregate the Smokers

CHICAGO

TO THE EDITOR:

Being allergic to the nicotine poison in tobacco smoke, as many people are, I would like to see this point stressed somewhat more definitely. Physicians tell me that this is the cause of my colds, more than anything else. They say that many people, who are finding it almost impossible to escape a constantly tobacco laden atmosphere, are kept ailing for that reason.

In your February 27 issue, "One Conscientious Trainman", in commenting on Clarke A. Richards' article on See Yourself As Your Passenger Sees You, points out that many smokers resent being requested to cease this annoyance. He is much too soft spoken and might have said that such smokers insist on the special privilege of injuring any and all others at their own selfish pleasure. They do not pay for any such special privilege and I think it is time that we who invariably pay the railroads extra for a private seat, and all those who ride trains instead of private autos in response to advertising, should be protected against this injury.

It is up to the railroad managers to find out how to confine smoking strictly to smoking cars and compartments and keep it out of public cars, including diners. I do not believe that they must solicit business by catering to selfish patrons at the expense and annoyance of the majority.

A TRAIN RIDER BY PREFERENCE

Large Service Rendered by Railways

JACKSON, TENN.

TO THE EDITOR:

The article "See Yourself as Your Passengers See You" by Clarke A. Richards, in your issue of January 30, has been read with much interest.

I am a passenger conductor, having been in service on the Gulf, Mobile & Northern for the past thirty-two years. It is not one of the large systems but it is, we believe, typical of the useful and cordial and generous services which the railroad industry furnishes.

During my railroad experience I have had opportunities, of course, to come in contact not only with many thousands of patrons but also a very large number of other railway employees, both on our line and on other lines, and my observation compels me to believe that the instances of discourtesy which Mr. Richards enumerates are the exception and not the rule. The responsibility for the operation of a passenger train, or any other train for that matter, which devolves upon a conductor and his associate employees is one of serious importance. In running a passenger train, for instance, there are many duties in addition to the collection of tickets, and the temperament and experience of all of us is so varied that it is quite natural for one conductor to be abstracted with other problems, while another might be able to be affable and cordial as he visits among his passengers. I believe that an act of discourtesy on the part of any of our passenger train employees, whether it be on our pride—The Rebel—or on the most unprofitable branch line, would be a most unusual occurrence.

My purpose in writing this letter, however, is not so much to defend the good manners of railway employees as to call to the attention of Mr. Richards and other travelers the essential service which the railroads, and we who operate them, render to the public. Mr. Richards brings into his discussion a comparison of the service rendered by the bus lines and that furnished by railroad passenger trains. As he and his companions discussed this subject and others, they sat in a club car with its many conveniences. They had attendants to minister to their needs. They could converse together in the club car or they could read or sleep alone and unmolested in some other car. They could eat when they pleased and there were toilet facilities at their disposal. The service which he received when he traveled on a highway bus had practically none of these luxuries or conveniences.

But the railroads render much greater and more useful service than that indicated by the items which I have mentioned. Just now we are emerging from the ravages of a disastrous flood in our territory. The Red Cross, of course, has been the responsible benefactor and chief aid to the distressed, but I doubt if any other agency has rendered so much valuable and unselfish relief to the unfortunate victims of this flood as the railroads. On my train refugees have come as passengers without money and without any particular destination, and I am sure they have received as much or more consideration than have drawing room passengers. There has been no disaster in our territory during my employment in which the railroad has not taken upon itself willingly the relief which nobody else could give.

Our railroad furnishes me, and many others like me, a job and an opportunity for useful citizenship. In return, it expects us to furnish to our passengers, first, safe service and, second, pleasing service. This, I believe, all of us try to do.

In the meantime, I am not forgetting that the railroads have paid an enormous amount of taxes for many years toward repaying money which was borrowed for building schools and highways and for public improvements of various types. They not only have already paid out much money of this kind but they must still pay for many more years to come for the bonds that were issued to create these public improvements, while at the same time this new form of transportation, the buses, which Mr. Richards mentions, have escaped with a minor obligation.

Railroads and their employees still continue to make up the most dependable, the safest and the cheapest form of transportation. I believe we employees are doing a better job of it all the time, and I think we may be counted upon to continue in our efforts to render both to travelers and shippers a satisfactory service.

W. A. STRONG.

New Book

Corrosion Resistance of Metals and Alloys. Robert J. McKay and Robert Worthington. An American Chemical Society Monograph published by the Reinhold Publishing Corp., 330 West Forty-Second street, New York. 492 pages, 6 in. by 9 in., illustrated. Price, $7.

The purpose of this work is to summarize the facts on corrosion processes and rates. Data from experience and test on the action of alloys, under given conditions, form the main part of the book. The preliminary part attempts to classify and explain the important points of the general theory and mechanism of corrosion. While the data offer no panacea for corrosion difficulties, a combination of data from Part II with the general facts of Part I should enable the reader to reason for himself on corrosion problems on which direct information is not available. The materials which are dealt with in Part II are magnesium and its alloys, aluminum and its alloys, zinc and zinc coatings, cadmium plate, tin and tin plate, lead, iron and steel, silicon-iron, molybdenum and chromium alloys, chromiumplate, nickel and nickel-iron and nickel-copper alloys, copper and high-copper alloys.

NEWS

Return of 2.7 Per Cent for January

$38,436,679 in net railway operating income—$35,-728,532, in 1936

Class I railroads of the United States in January, 1937, had a net railway operating income of $38,436,679 which was at the annual rate of return of 2.7 per cent on their property investment, according to the Bureau of Railway Economics of the Association of American Railroads. In January, 1936, their net railway operating income was $35,728,532 or 2.51 per cent on their property investment, and in the same month of 1930 it was $54,645,698 or 3.81 per cent.

CLASS I RAILROADS—UNITED STATES

Month of January

	1937	1936	1930
Total operating revenues	$331,684,689	$299,058,328	$445,920,950
Total operating expenses	253,664,142	231,741,087	352,338,745
Taxes	28,472,704	21,564,509	28,939,753
Net railway operating income	38,436,679	35,728,532	54,645,698
Operating ratio—per cent	76.48	77.49	79.01
Rate of return on property investment	2.70%	2.51%	3.81%

Gross operating revenues for January, totaled $331,684,689 compared with $299,-058,328 for January, 1936, and $445,920,-950 for January, 1930, an increase of 10.9 per cent in 1937 above 1936, but 25.6 per cent below 1930. Operating expenses amounted to $253,664,142 compared with $231,741,087, for the same month in 1936, and $352,338,745 for the same month in 1930, being 9.5 per cent greater than in January, 1936, but 28 per cent below 1930.

Class I roads in January, paid $28,472,-704 in taxes compared with $21,564,509 in the same month in 1936, and $28,939,753 in the same month in 1930—the increase over last year being $6,908,195 or 32 per cent. Thirty two Class I roads failed to earn expenses and taxes in January, of which nine were in the Eastern district, five in the Southern district and 18 in the Western district.

Class I roads in the Eastern district for January had a net railway operating income of $25,261,629, at the annual rate of return of 3.72 per cent. For the same month in 1936, their net was $24,691,693 or 3.63 per cent, while in 1930 it was $32,-939,155 or 4.92 per cent. Gross revenues in the Eastern district for January, totaled $168,907,757, an increase of 8.4 per cent compared with 1936, but a decrease of 25.7 per cent compared with 1930. Operating expenses totaled $124,214,853, an increase of 7.6 per cent above the same month in 1936 but a decrease of 29.4 per cent under the same month of 1930.

Class I roads in the Southern district for January had a net of $4,892,487, which was at the annual rate of return of 2.03 per cent. For the same month in 1936, their net amounted to $4,712,650, or 1.96 per cent, and for the same month in 1930 was $7,576,945 or 3 per cent. Gross revenues in the Southern district for January, amounted to $42,523,456, an increase of 8.4 per cent compared with January, 1936, but a decrease of 28.5 per cent under the same month in 1930. Operating expenses totaled $32,817,639, an increase of 6.6 per cent above 1936, but a decrease of 30.6 per cent under 1930.

Class I roads in the Western district for January, had a net of $8,282,563, a return of 1.65 per cent. For the same month in 1936, those roads had a net of $6,324,189, a return of 1.26 per cent, and for the same month in 1930 it was $14,129,598 or 2.76 per cent. Gross revenues in the Western district amounted to $120,253,658, an increase of 15.7 per cent above January, 1936, but a decrease of 24.5 per cent under the same month in 1930. Operating expenses totaled $96,631,650, an increase of 13 per cent compared with the same period in 1936, but a decrease of 25.1 per cent under the same month in 1930.

Law Requires "Headlights" on Rear of Locomotives

A bill to provide for "headlights" not only on the front end of locomotives, but also on the rear, was passed by the Oregon House of Representatives on February 28 and sent to the governor for his signature.

MacDonald Will Address A.R.E.A.

As a special feature of the program for the convention of the American Railway Engineering Association, Thomas H. MacDonald chief of the United States Bureau of Public Roads, will address the convention at 11 o'clock on Wednesday forenoon, March 17, on the federal grade separation program and its relation to the railways.

New Century and Broadway Planned

N.Y.C. and P.R.R. collaborating on equipment and faster schedules

New streamline equipment and expedited schedules for the New York Central's "Twentieth Century Limited" and the Pennsylvania's "Broadway Limited" were forecast in a joint statement issued by those two roads on March 9. These two trains, on which a charge of $7.50 in addition to the New York-Chicago fare is now assessed, make the run between those cities in 16½ hrs.; and the statement says that "a quickening of passenger schedules" in this service is contemplated.

Staff engineers of the two roads and industrial engineers are collaborating in the design and construction of entirely new equipment for the trains. The program also contemplates a general improvement in and the extension of the new type of equipment to certain other principal services between eastern and western terminals of the two roads.

"The new equipment" the statement continues, "will mark a distinct departure from that now in service. While it will preserve the advantage of spaciousness afforded by standard-size Pullman cars, it will embody many novel features of interior design, decoration and arrangement." It will include lounge, sleeping and observation cars, to be built by the Pullman Company in accordance with designs now being worked out in cooperation with the two roads.

Both the Pennsylvania and New York Central, the statement further reveals, have been experimenting with modernistic equipment and also have been studying new types of equipment, which have been in operation in other territories, with a view to adopting designs suitable to the service requirements and operating conditions on their respective systems.

Traffic Course Sponsored by State

A complete course in traffic management, sponsored by the state department of public instruction, is being offered to all persons over 16 years of age free of charge, at the Lincoln school and the Y. M. C. A. in Springfield, Ill. The course includes the handling of all freight traffic via railroads, electric lines, steam boats, barge lines, highway transportation and railway express lines from consignor to consignee.

Report by R.F.C. on the Milwaukee

Finds road in good physical condition and adequate for increased traffic

The Reconstruction Finance Corporation has issued an exhaustive report on the Chicago, Milwaukee, St. Paul & Pacific, which finds that the property is in good physical condition and now adequate, not only for present traffic, but also for a substantially increased volume. A summary of the report follows:

"Physical condition of track and structures has been built up and much improved in the past decade, and is now adequate, not only for present, but also for a substantially increased, traffic volume. Standards are good and have been well, and economically, maintained. Advantage has been taken of mechanical aids in reducing maintenance costs. Much has been done in prolonging rail life by proven modern methods. Tie condition has been steadily improved and longevity increased by use of preservative treatment and application of tie plates. Ballast is generally ample and of good quality. Bridging has been adequately maintained and much timber trestling replaced with permanent work in recent years. The current, and future, rail, tie and ballast renewal programs are adequate to maintain, and progressively improve, the good track condition which has been achieved.

"Equipment condition, both locomotive and car, is good; facilities for its maintenance are adequate and repair costs economical. Savings are being effected, by building cars—freight and passenger—in the road's own shops, as compared with outside purchases. Locomotive utilization and performance have been improving in recent years and continuing efforts in this direction are being made. Recent purchase of 30 new freight locomotives for mid-1937 delivery will materially help transportation performance and, incidentally, create a substantial reserve of power to meet the needs of increased traffic. Annual operating savings—less depreciation—are estimated at approximately 12 per cent on this investment. Considering age, type of construction and service character, of the freight cars, it may be said that except for meeting the needs of currently increasing traffic and filling gaps in certain classes, resulting from the retirements of the past decade, the ownership is fairly adequate. Certain additions made in 1936, and to be made in 1937, will materially strengthen this situation. The passenger train cars are being currently improved and ownership increased. Additions of the past three years have featured a modern type in which the use of high capacity steel alloys and other light-weight materials, coupled with improvements in design, has produced a unit lighter by about one-third than former equipment. The road is keeping abreast of the times in installation of air-conditioning. The 1937 program of additions to, and improvement of, existing passenger train equipment comprises the construction of 33, and the air-conditioning of 45 units.

"Transportation is efficiently conducted. As compared with the Northwestern region (excluding three iron ore carriers), the Milwaukee leads in heavier train loading and lower unit consumption of fuel, the two most important factors in achieving low ton-mile costs. The Milwaukee is burdened with a greater proportion of empty freight car miles than its Northwestern neighbors. An analysis of this matter is under way and will be covered in a supplemental report. Transportation accomplishment is handicapped by service necessarily rendered on a considerable mileage of thin traffic branch lines. Some such mileage has been abandoned, and other abandonments are being studied, or urged, before regulatory bodies. There is much more to be done in this direction."

The report includes a separate study of transportation methods and results on each operating division, coupled with some observations and suggestions. Electric operation in mountain territory is called "efficient but handicapped by a badly unbalanced traffic—roughly two-thirds eastbound. This condition obtains on all of the territory west of Mobridge, South Dakota."

"The organization for, and the quality of, management is good."

And This is Just as True for State Legislatures

Almost any member of the House or Senate will agree that a wage-worker with average intelligence is a more effective witness at Congressional hearings on labor matters than the most glib-tongued and high-priced attorney a labor organization can hire to present its case.

"Members of Congress, a majority of whom are attorneys and orators themselves, are not awed by a man who can quote long statutes from memory, or burst into rhetorical cascades of flowery language. Such witnesses are frequently tied into knots by a few well chosen questions. Worker-witnesses, who don't try oratory, but state their facts, invariably impress committee members as knowing, from practical experience, what they are talking about."

—Budd L. McKillips in the "Railway Conductor"

Injunction Granted Against Louisiana Sales Tax

An injunction restraining Louisiana from collecting a two per cent tax on the gross receipts of the Kansas City Southern was granted in New Orleans, La., on March 8, by a three-judge federal court composed of Senior United States Circuit Judge Rufus E. Foster, and District Judges Wayne G. Borah and Sidney Mize. No opposition was offered to the issuance of the preliminary restraint against the state collection, the state being willing for the matter to remain in status quo pending decision on the statutes under which the tax is imposed and collected.

Support Canada's Regulatory Bill

Railroads and package freight carriers on Great Lakes urge passage

United and enthusiastic support of the legislation from the railways and the package freight carriers on the Great Lakes and a statement from the Minister of Transport, Hon. C. D. Howe, in which he listed a number of important amendments that would be made to the measure featured two sessions of last week's hearings of the Canadian Senate committee on railways, telegraphs and harbors, which is dealing with the bill to extend the jurisdiction of the Board of Transport to inland shipping, to interprovincial highway traffic and to aerial freight movement.

"The intent of this bill," declared Mr. Howe in a lengthy statement to the committee, "is to create a reasonable extension of the policing powers of the State entirely in the public interest." There was no intention to limit the development on sound economic lines of any form of transport in favor of any other. "It is not the case," said the Minister, "that regulation has been used either to force rates down to uneconomically low levels or to permit them to be set unduly high in the interest of the carrier." He also stressed the point that publicity of tariffs was essential to prevent discrimination.

Presenting the case for the Canadian Pacific and Canadian National and for the Pere Marquette and the Michigan Central, two American roads operating across southwestern Ontario, E. P. Flintoft, chief counsel for the C. P. R., told the committee that they were in favor of the extended regulation contemplated in the bill, that they even felt the measure did not go far enough. The railways, he said, had found that the regulation under which they had operated for more than thirty years had proved beneficial both to the shippers and the carriers.

The railways frankly favored regulation of inland shipping because they had suffered much through unfair competition with the package freight carriers on the Great Lakes. The railways, Mr. Flintoft intimated, also welcomed regulation of traffic between the Atlantic and the Pacific coasts of Canada through the Panama Canal, a traffic which had seriously injured railway revenues. Mr. Flintoft was more pronounced in his argument for at least a start in federal regulation of highway traffic, which, he said, in a year had cost railways $38,000,000 in revenue.

Specifying the changes which would be made in the bill, Mr. Howe told the committee that an amendment would be submitted to restrict Part II of the measure to the following: (1) Port-to-port traffic in waters Father Point and West; (2) traffic between the lower St. Lawrence and the maritime ports, Father Point and East; (3) traffic between Fort William and Port Arthur and the East, on the one hand, and ports on Canada's Pacific coast.

It was intended, Mr. Howe explained,

to exclude from the bill all coastwise port-to-port traffic between the Gulf of St. Lawrence and Atlantic ports in Canada, east of Father Point, and all coastwise port-to-port traffic between Pacific coast ports in Canada. As to Part III, which deals with air traffic, it was not the intention at present to apply rate regulation in case of irregular services in northern Canada, such as in the mining areas. He made it plain, too, that the regulation of inter-provincial motor traffic would not be used as a source of revenue, but that merely a nominal registration fee would be charged.

Another interesting point made by Mr. Howe in connection with the proposal to regulate inland shipping was that a similar measure had been introduced in Congress by the Roosevelt administration, that there would soon be regulation of American shipping on the Great Lakes. This would remove the objection that if the bill he had introduced were passed, only Canadian vessels on the Lakes would be subjected to rate regulation. He stated, incidentally, that practically all of the British countries had such regulation as was now contemplated.

Bernard Allen, of the Canadian National, outlined the effects of what was described as "cut-throat" competition between truck operators and declared the provinces in the areas within which they had exclusive jurisdiction were not even exercising proper regulation. He charged, too, that the provincial governments, in objecting to this part of the bill, were minimizing the extent of highway competition with the railways, and he stated that in Ontario and Quebec today there were 5,000 licenses issued in each province to "for hire" trucks, that the increase in the number of such trucks in Ontario especially was out of all proportion to the growth in traffic.

John P. Doherty, of the Lake Freight Association in Montreal, a body comprised of the package freight carriers on the Great Lakes, operating thirty vessels, said these carriers had at first been apprehensive about the probable effect of the bill, but that since hearing the statement of Mr. Howe and the views of the railways as presented by Mr. Flintoft they now felt reassured and believed much good would be derived from the legislation as it was proposed to be amended. He admitted the package carriers had regulated themselves fairly satisfactorily up to date, but they welcomed the kind of state regulation as proposed by the Minister. Mr. Howe interjected that he had received communications from vessel operators on the Great Lakes and that those operating 75 per cent of the lake tonnage had expressed themselves as favorable to the bill.

Among those associated with Mr. Flintoft before the committee on behalf of the railways were George Stephens, of the Canadian Pacific, and E. E. Fairweather, chief counsel, and Alistair Fraser, vice president in charge of traffic, of the Canadian National.

Bartel Is New I. C. C. Secretary

The Interstate Commerce Commission has appointed W. P. Bartel, of Wisconsin, Secretary of the commission to succeed the late George B. McGinty. Mr. Bartel is a graduate of the ranks, having been with the commission for 31 years. He has served as director of the Bureau of Service since April, 1923.

Accounting Convention Plans

W. H. Whitehead, comptroller, Reading, has been appointed chairman of the committee on arrangements for the annual meeting of the Accounting Division, Association of American Railroads, to be held on June 2, 3 and 4, at the Hotel Traymore, Atlantic City, N. J., it has been announced by F. J. Fell, Jr. (vice-president, P. R. R.), chairman of the division.

Fort Worth & Rio Grande to be Part of Southern Division of Santa Fe

The Fort Worth & Rio Grande, which the Atchison, Topeka & Santa Fe recently acquired from the St. Louis-San Francisco through the purchase of stock, is being operated as a part of the Southern division of the Santa Fe's Gulf Lines effective March 1. The acquired lines, extending from Fort Worth southwesterly to Menard, Tex., crosses the Santa Fe at Brownwood.

Club Meetings

H. F. Neumann of the Technical Service division, Colgate-Palmolive-Peet Company, Jersey City, N. J., was the speaker at the meeting of the Eastern Car Foreman's Association, held on March 12 in the Engineering Societies building, 29 West 39th street, New York.

The Traffic Club of Baltimore held its annual inaugural ball at the Lord Baltimore Hotel on March 2.

Peoria Transportation Club Elects Officers

At the annual meeting of the Peoria Transportation Club on February 25, the following officers were elected for the ensuing year: President, Edward F. Stock, traffic manager of the Peoria & Pekin Union; first vice-president, Edward J. Plover, general traffic manager of the American Distilling Company; second vice-president, Edward T. Olander, general agent of the Erie; and secretary-treasurer, Larry A. Daley, traffic manager of the Kroger Grocery & Baking Company.

New York Railroad Club

The March 19 meeting of the New York Railroad Club, to be held in the auditorium of the Engineering Societies building, 29 West 39th Street, New York, will be "Electrical Night". The program, which has been arranged under the auspices of the General Electric, will include a discussion of "Electricity—Railroads Economic Aid" by Clarence C. Bailey of the G. E. Transportation Department. Also, a sound film entitled "Modern Electric Transit" will be shown.

Railway Employment in February

Class I railroads, excluding switching and terminal companies, reported to the Interstate Commerce Commission a total of 1,095,932 employees as of the middle of February, an increase of 6.15 per cent as compared with the number in February, 1936, and an increase of 1.91 per cent as compared with January, 1937. The maintenance of equipment and stores group showed an increase of 9.47 per cent as compared with February, 1936. With adjustments for seasonal variation the number in February was 63.8 per cent of the 1923-1925 average.

A. A. R. Merges Operating and Transportation Divisions

The Association of American Railroads has announced that effective March 1, the Operating and Transportation divisions of the Association were consolidated into one division, to be known as the "Operating-Transportation division." The officers of the division are: Chairman, J. Cannon, chief operating officer, Missouri Pacific Lines; Vice Chairman, G. Metzman, manager, freight transportation, New York Central System; chairman, general committee, G. C. Randall; secretary, L. R. Knott.

Opposes Interstate Commerce Commission Reorganization

Representative Mapes of Michigan, a Republican, told the House of Representatives this week that he will oppose reorganization of the Interstate Commerce Commission along lines proposed by the Brownlow committee in its report to President Roosevelt. "It is impossible to get the full import and implications of the Brownlow committee report without a careful study of it," Mr. Mapes stated. "But, stated briefly, as far as its proposal relating to these regulatory commissions is concerned, it recommends that they be deprived of their independent status, placed in one or another department of the government and put under the control of a member of the cabinet." Mr. Mapes expressed the belief that if this plan is carried out, it would mean a radical change which would bring the regulatory commissions under political control.

I. C. C. Examiner Flynn Dies

Leo J. Flynn, attorney-examiner for the Interstate Commerce Commission, who had become well known during the past decade for his work on commission investigations of highway transportation, died on March 4, at Dubuque, Iowa. He was 57 years old. Mr. Flynn conducted both the 1927 and the 1930 hearings in connection with the Interstate Commerce Commission investigations of motor transport. His 1928 and 1932 reports and recommendations in these investigations had much to do with the shaping of federal policy in connection with the present regulation of buses and trucks.

Traffic Clubs to Meet in New York

The Associated Traffic Clubs of America will hold its spring meeting at the Commodore hotel, New York, on April 20 and 21, at which time the Traffic Club of New York will be the host to the convention, while the Metropolitan Traffic Association of New York, Inc., The Traffic Club of Newark, The Women's Traffic Club of Greater New York, The Traffic

Club of Jersey City, Inc., The Traffic Club of Brooklyn, Inc., and The Bronx Traffic Club will act as associate hosts. Subjects of national interest will be discussed by prominent speakers.

L. N. E. Plans More Streamliners

The "marked success" of the London & North Eastern's streamlined "Silver Jubilee" steam train, operating between London and Newcastle, has prompted that British road to plan for the installation of a streamlined train between London and Edinburgh, according to a recent statement from T. R. Dester, Associated British Railways, New York.

The new train will be placed in service in July and will be named "Coronation". In the fall another high-speed service will be established between London and West Riding, making the run in 2 hours 45 minutes—25 minutes faster than the best present schedule between these points.

Another Distribution by Railroad Credit Corporation

E. G. Buckland, president of the Railroad Credit Corporation, announced on March 5 that the Corporation will make a liquidating distribution of one per cent on March 15, amounting to $735,407. Of this amount $435,875 will be paid in cash and $299,532 will be credited on carriers' indebtedness to the corporation. This will bring the total amount distributed to $51,478,496 or 70 per cent of the fund originally contributed by the carriers participating in the 1931 marshalling and distributing plan. Of this total $25,205,730 will have been returned in cash and $26,272,766 in credits.

Rails to Participate in Chicago Jubilee

A Travel-to-Chicago-by-Rail committee has been appointed by the mayor of Chicago to promote travel to this city in connection with a charter jubilee celebration, which opened on March 4 and will continue for seven months. The committee, consisting of local representatives of nearly every major railroad, includes B. E. White, general western manager of the American Express Company as chairman, and H. W. Siddall, chairman of the Transcontinental Western Railroad Passenger Association and C. A. Fox, chairman of the Central Railroad Passenger Association as co-chairmen, and Harry Dooley, president of the Gray Line Association, Inc., as secretary.

R. F. C. Chairman Favors Chicago & Eastern Illinois Plan

Chairman Jesse Jones of the Reconstruction Finance Corporation has announced that he has formally advised the Chicago & Eastern Illinois that the RFC accepts the revised plan of reorganization new before the Interstate Commerce Commission and is prepared to render the financial aid proposed in the plan. Mr. Jones also said that he thought that substantial progress had been made by the parties toward an agreement on a revised plan of recapitalization for the Missouri Pacific. He said that holders of Texas Lines obligations offered the greatest objection to their treatment and presented the largest obstacle.

To the question concerning railroad conditions, the RFC head replied that "they are coming to life pretty fast." He went on to say that railroad recovery would make it increasingly difficult to obtain acceptances of plans of reorganization and added, "I still think they should be reorganized so they won't topple over again. They should have more income and less fixed interest obligations."

Pension Negotiations to be Carried to a Conclusion

Member roads of the Association of American Railroads, at a special meeting called at Chicago on March 4 to discuss reports on retirement annuities, authorized committees negotiating with the Railway Labor Executives' Association to continue negotiations to a conclusion. At this meeting committees representing railroad managements reported on the progress made with the labor organizations in working out a compromise co-ordinating the railway pension act and the social security act, as applied to railways. Negotiations to work out a satisfactory plan for a system of retirement annuities for railroad employees were begun at Washington on January 7, at the request of President Roosevelt. Further conferences will be held until an agreement is reached.

Indiana House Passes Full Crew Bill

The Indiana House of Representatives, by a vote of 53 to 39, has passed a "full crew" bill which requires not less than four trainmen for trains of less than five cars, not less than six trainmen for trains of 50 cars or more, not less than five trainmen or yardmen on locomotives used in yards, and lot less that three on locomotives used on main lines for purposes other than carrying freight or passengers. The bill, if passed by the Senate and signed by the governor, would become effective June 1.

The house has also passed another bill, which forces railroads to bring trains to a full stop at all highway crossings where automatic devices are not installed, and makes superintendents and other officers liable for violations.

A bill introduced into the Indiana Senate permits a common carrier operator to leave the scene of an accident before the arrival of the coroner where a person has been killed, provided the body is left in charge of a member of the crew or other agent of the carrier. Under the preser law, which prevents moving the vehicle from the scene, long delays have been occasioned while the coroner was reaching the scene of the accident.

First Year of Country-Wide Air-Express Services

More than 2,023 tons of air express matter were handled by the Railway Express Agency during the first full year of its expanded air services, according to a recent anouncement. It was on February 1, 1936, that the Express Agency became the exclusive handler of express matter for 23 air lines. Revenue from this business for the 12-month period ended January 31 was 67.5 per cent above the gross revenue of the old and new contract lines for the corresponding year ended January 31, 1936.

Most of the 487,299 consignments handled during the year were carried by 500 regularly scheduled planes but the statement points out that planes are always available for special trips when the volume of business warrants. Under its present setup the direct air express services of the Express Agency are available to 216 cities in the United States and Canada. Also, co-ordination with the railway express services expedites movements to other communities not located on the air lines.

Safety Lesson for April

Continuing its safety lesson on injuries to employees due to "falling from cars and engines," the Committee on Education of the Safety Section, Association of American Railroads, has devoted its April circular and poster to a discussion and picturization of causes of "falls from engines." The March circular and poster were devoted to injuries due to "falling from cars."

As in the latter, the discussion and pictures in the April circular are based on replies from 500 trainmen to the question "Why do men fall from engines and cars, and what can be done to prevent them from falling?" Again the necessity for getting "a firm grip and a safe foothold" is emphasized in the circular. The poster, done in red and green, imposes upon the former color a picture (captioned "Red is a Sign of Danger") showing the "wrong and unsafe" way to climb down from an engine cab, while the "right and safe way" is shown on the green background over the caption "Green is a Signal for Safety."

Accounting Officers to Hold D. C. Round Table

The second of a series of regional educational conferences of railway accounting officers, sponsored by the accounting division of the Association of American Railroads, under the chairmanship of F. J. Fell, Jr., vice-president, Pennsylvania, will be held at the Washington Hotel, Washington, D. C. Attendance is limited to railway accounting officers, since the conference is informal and "off the record." The program follows:

Results of Field Audits and Reports to the Commission under Section 77 of the Bankruptcy Act, by Alexander Wylie, Director of the Bureau of Accounts, I. C. C.

Reorganization Adjustments of Capital under Authority of Section 77 of the Bankruptcy Act, by F. A. Barnes, Assistant Director of the Bureau of Accounts, I. C. C.

Transport Traffic Statistics, by Dr. M. O. Lorenz, Director of the Bureau of Statistics, I. C. C.

Relation of Transportation Costs to Marketing, by W. H. S. Stevens, Assistant Director of the Bureau of Statistics, I. C. C.

Cost Finding in Railway and Highway Freight Service for Regulatory Purposes,

by Arthur F. White, Assistant Director of the Bureau of Statistics, I. C. C.

Revenue Act of 1936, by Arthur H. Kent, Assistant General Counsel, Treasury Department.

Depreciation of Railway Property for Income Tax Purposes, by Dean W. Martin, Chief, Appraisal Section (Valuation Division), Bureau of Internal Revenue.

Commissioner Meyer Questions Missouri Pacific Plan Estimates

Intimating that the Interstate Commerce Commission would give little consideration to expert opinion regarding traffic potentialities in dealing with railroad reorganization plans, Commissioner Meyer of the division of finance, said that he doubted the value of traffic forecasts unless the market possibilities had been studied. Mr. Meyer made these observations at a hearing on the reorganization plan of the Missouri Pacific which was held before the commission on March 9. The observations were made during the testimony of L. Alfred Jenny, New York consulting engineer, who had been employed by the New York Trust Company, trustee under the International Great Northern adjustment mortgage, to make a survey of that property and the Gulf Coast Lines. Col. N. B. Ballantine, transportation analyst, formerly with the Federal Co-ordinator of Transportation, told the commission that the Gulf Coast Lines was overcharged $235,000 a year for car hire during the three years from 1932-34, inclusive. The hearing was adjourned on March 10 to April 19th.

Supreme Court Sets Aside California "Caravan" Act

The United States Supreme Court has set aside California's "caravan" act, which imposed a tax of $15 upon each automobile brought into the state, on its own wheels or in tow of another vehicle, for the purpose of being sold in California. The decision was rendered in the case of Ingels, Director of the Motor Vehicle Department of the State of California, vs. Morf.

The California act directed that the fees collected be paid into the general fund of the state treasury for the purpose of reimbursing the state treasurer for the added expense which the state may incur in the administration and enforcement of the act and the added expense of policing the highways over which such caravaning may be conducted. The lower court held that the statute unduly burdened interstate commerce, and this finding was affirmed.

The court distinguished this case from that of Morf vs. Bingaman, 298 U. S. 407, in which the caravan act of New Mexico was upheld. The New Mexico act imposed a fee of $7.50 for each vehicle moving by its own power and $5 for each vehicle towed by another, and made the payment of the fee a condition for the privilege of using the highway. The California act, according to the court's opinion, imposed too high a tax upon the privilege. It was pointed out that a tax of one-third of the amount actually imposed would be sufficient to take care of the necessary policing. The case turned also upon the fact that the payment of the fee was not made a condition for the use of the highway, nor did it appear satisfactorily that the entire amount collected was to be used for highway purposes.

Program for the A. R. E. A. Convention

The following is the program for the thirty-eighth annual convention of the American Railway Engineering Association, which will be held at the Palmer House, Chicago, on March 16-18:

TUESDAY, MARCH 16
Morning Session—9 a. m.

Convention called to order
President's address—A. R. Wilson, engineer bridges and buildings, Penna., Philadelphia, Pa.
Reports of the secretary and of the treasurer
Reports of committees on
- Standardization
- Yards and Terminals
- Shops and Locomotive Terminals
- Uniform General Contract Forms
- Waterproofing of Railway Structures
- Electricity

Afternoon Session—2 p. m.

Reports of committees on
- Water Service, Fire Protection and Sanitation
- Waterways and Harbors
- Complete Roadway and Track Structure
- Roadway
- Ballast

WEDNESDAY, MARCH 17
Morning Session—9 a. m.

Reports of committees on
- Wood Bridges and Trestles
- Iron and Steel Structures
- Impact
- Economics of Bridges and Trestles

Address by Thomas H. MacDonald, chief of Bureau of Public Roads, U. S. Department of Agriculture
Report of committee on Highways

Luncheon

Address by Judge Harold B. Wells, Court of Errors and Appeals, State of New Jersey

Afternoon Session—2:30 p. m.

Reports of committees on
- Rail
- Stresses in Railroad Track
- Signals and Interlocking
- Records and Accounts
- Economics of Railway Operation

6 p. m.

Dinner with Western Railway Club—Address by Dr. A. N. Talbot, professor emeritus, University of Illinois, chairman, Special Committee on Stresses in Railroad Track

THURSDAY, MARCH 18
Morning Session—9 a. m.

Reports of committees on
- Maintenance of Way Work Equipment
- Economics of Railway Labor
- Ties
- Economics of Railway Location
- Rules and Organization

Afternoon Session—2 p. m.

Reports of committees on
- Track
- Masonry
- Buildings
- Wood Preservation

Closing business

C. N. R. Recapitalization

Denying that the Securities Trust was to be used for any improper purpose and urging that its sole purpose was to take over and perpetuate such priority claims of the Dominion against the original debtor corporations Hon. C. D. Howe, Minister of Transport, moved on March 5 in the Committee on National Railways and Shipping at Ottawa two amendments which will go far toward meeting the criticisms of his measure to revise the accounting set-up of the Canadian National Railways.

Rapid progress was made on the legislation in committee and only sections 8 and 12 remain to be disposed of. "A complete historical record of accumulated costs of the National system, and other railways in Canada, to the Dominion Treasury since Confederation is as much a definite part of the plan as the proposed balance sheet adjustments themselves," said Mr. Howe in answering objections that the projected revision might not fully present the real picture of the publicly owned road. He moved an amendment which, he said, would cover this whole matter.

Exception was taken by the Minister to the suggestion that the Securities Trust was to be used "for some improper purpose and as some sort of subterfuge for hiding the complete scope of the proposed elimination of advances and accrued interest."

"The Securities Trust," said Mr. Howe, "is being created solely for the purpose of taking over and perpetuating such priority claims of the Dominion as may be deemed to exist and the underlying collateral against the original debtor corporations."

"Elimination of the debt duplication other than by a Securities Trust," declared Mr. Howe, "could only have been accomplished by the direct cancellation by the Dominion of the relative claims against the original debtor corporations. Such outright cancellation would have indirectly altered the status of the existing priorities to the disadvantage of the Dominion. The Securities Trust is to protect the Dominion against any future contingencies in this respect."

It was suggested and subsequently moved by the Minister that the bill specifically provide that the balance sheet and the annual report of the Securities Trust be submitted to parliament annually and concurrently with the annual report of the Canadian National Railways which would, as formerly, be referred to the Committee on National Railways and Shipping.

Suit Over Fort Benning Line

The receivers of the Seaboard Air Line filed a tariff extending Fort Benning Junction, Ga., switching limits to include receiving and delivery tracks at Fort Benning military post. The Interstate Commerce Commission ordered the tariff to be stricken from the files on the ground that it extended to a station and covered transportation not on the Seaboard's line, in violation of Sec. 6 (1) of the Interstate Commerce Act (206 I.C.C. 352). The Seaboard sued to annul the order. The suit was opposed by the United States and the commission, and the Central of Georgia intervened with a counterclaim. A three-judge federal court for southern Georgia, composed of a circuit judge and two district judges, held the order valid on the grounds that the tariff aided the Seaboard to violate the act, Sec. 1 (18) as to extensions, and unduly impaired the Seaboard's line-haul revenue. (12 F. Supp. 938). It enjoined the Seaboard from extending its line to Fort Benning and from operating the extension. The circuit judge dissented.

The Supreme Court of the United States,

on appeal by the Seaboard receivers, has now reversed the district court's decree, holding that the commission's order was void and should be set aside.

A railroad 6.3 mi. between Fort Benning and Fort Benning Junction, built and owned by the United States, had been operated for eight years by the Central of Georgia under license from the Secretary of War. On the revocation of that license in 1932, the line was leased to contractors, who organized the Fort Benning Railroad Company, to operate in conjunction with the Seaboard. This company failed to get a certificate as a common carrier. The Seaboard then filed the tariff and appointed the contractors its agents for transportation over the line at agreed on rates, reserving the right to perform the transportation with its own engines and crews. The contractors reserved the right to render like services for the Central of Georgia and other carriers.

The Supreme Court holds that the commission, in considering an application for a certificate, might pass incidentally, in determining its jurisdiction, upon the question whether the project was one covered by Sec. 1 (18) authorizing extensions. But the decision of that question is held for the court in either a suit to set aside an order granting a certificate or in a suit to enjoin a violation of Sec. 1 (18). The function of the court is to construe that paragraph; that of the commission is to determine whether the project, if it is one covered by the paragraph, is in the public interest.

The court said there was nothing in the commission's findings to suggest that the tariff unduly burdens the Seaboard's revenue or that it is unreasonable or unjustly discriminatory. Therefore the lower court erred in sustaining the commission's order on the ground that the "tariff unduly impairs the line haul revenue."

The Central of Georgia's counterclaim was held not within the jurisdiction of the district court as not arising out of the transaction which was the subject of the suit. Powell v. United States. Decided March 1, 1927. Opinion by Justice Butler.

Wheeler Hearings Postponed for Few Weeks

After thoroughly delving into every phase of the financing of the Van Sweringen "rail empire," the Wheeler committee has adjourned indefinitely. It is known that funds are running low, and it is expected that the committee will need a part of the $150,000 appropriation which Senator Wheeler now has pending before the Senate Committee on Audit and Control before it will be able to begin hearings on the financial affairs of other railroads. Senator Wheeler stated that the hearing would be resumed upon the call of the chairman. He explained to partners of J. P. Morgan & Co., who have been the principal witnesses during the past week, that it would be at least three weeks before hearings would resume, as it would take at least that long for hearings on President Roosevelt's court reorganization bill. A preliminary report of the committee's work to date will be prepared in the near future.

The hearings on February 4 and 5 were concerned primarily with the part that J. P. Morgan & Co. played in the financing of the Van Sweringen enterprises. Most of the time was occupied in asking Thomas W. Lamont, George Whitney, of the J. P. Morgan & Co., and Harold Stanley, of Morgan, Stanley & Co., the same questions that were asked the officers of the Guaranty Trust Company earlier in the sessions. Senator Wheeler asked Mr. Lamont for a list of railroad presidents, directors and counsel to whom the Morgan bank had loaned money at any time. Mr. Lamont said that they would immediately furnish such a list.

The session on February 5 was enlivened by a sharp exchange of statements between Thomas W. Lamont and Max Lowenthal, counsel for Senator Wheeler's committee. Mr. Lowenthal complained that the committee investigators had had great difficulty in getting the desired information from the files of the Morgan company. He said that often they had found letters that they were searching for, which should have been in the Morgan files, in the files of other companies. Mr. Lamont explained that they had tried to do everything in their power to co-operate with the committee.

At the February 5 session Senator Wheeler produced a memorandum prepared by J. P. Morgan & Co. late in 1931 and asserted that the memorandum showed that the Morgans were the real owners of the Van Sweringen interests. Mr. Whitney denied that they had ever assumed active control, but likened their position to that of a mortgagee who has it in his power to foreclose if and when the mortgagor does not pay the mortgage.

* * * *

Construction

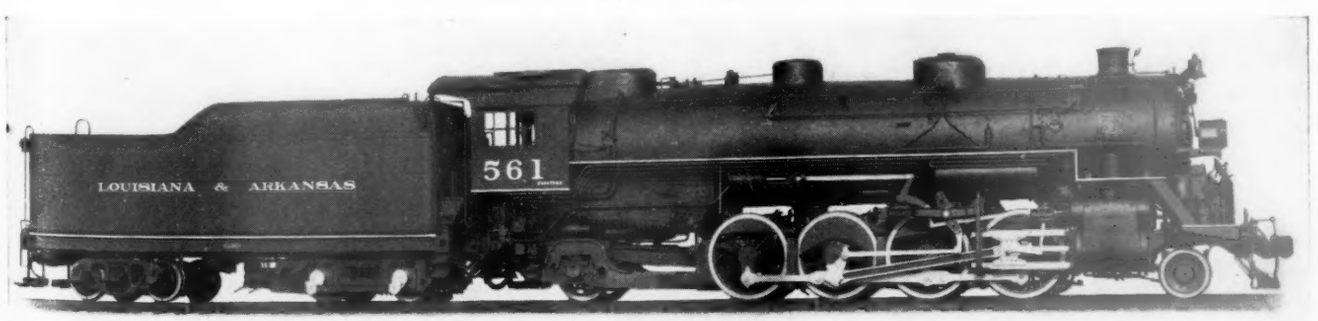
BALTIMORE & OHIO.—A contract has been given to Don J. Byrum, Inc., Wheeling, W. Va., for the construction of a produce building at Wheeling, to cost about $50,000.

CHESAPEAKE & OHIO.—Work on the expansion program of this road at its coal loading docks at Presque Isle, Ohio, and adjacent storage and assembly yard at Walbridge, Ohio, will involve a total cost of approximately $530,000. The work at Presque Isle consists of preparing grade and laying track for two 100-car pull-in tracks, thirteen 40-car classification tracks, one 30-car stub track and connecting track, and five additional load tracks; at Walbridge, the work consists of preparing grade and laying track for the extension of five tracks to hold 160 cars each and two short tracks to accommodate puller runs in the eastbound yard; also, connecting and extending four hump tracks on revised grade to hold 160 cars each. A contract has been awarded to G. L. LaBoiteaux, Toledo, Ohio, for approximately 2,000 cu. yd. of fill material for the two 100-car tracks and approximately 2,400 cu. yd. of excavation for the thirteen 40-car tracks at Presque Isle. Contract has been awarded to the American Aggregates Corporation, Columbus, Ohio, for furnishing approximately 20,000 cu. yd. of fill sand for the five load tracks and thirteen 40-car tracks at Presque Isle, as well as for furnishing approximately 95,000 cu. yd. of fill sand for the track changes at Walbridge. The track laying work will be handled by railway company forces.

NEW YORK CENTRAL.—The general contract for work on the section from 135th to 146th streets of the West Side Improvements in New York City has been let to the P. T. Cox Contracting Company, New York.

VIRGINIAN.—Bids were received March 8, for the construction of a 13-mile branch line on Clear Fork, from Simon to Oceana, Wyoming county, W. Va.

WESTERN PACIFIC.—A contract has been awarded to the Warren A. Bechtel Company, San Francisco, Cal., for the construction of a 1,684-ft. extension to this company's passing track in the Feather River canyon at David, Cal., at a cost of approximately $39,000.



One of Five 2-8-2 Type Locomotives Built by the Lima Locomotive Works for the Louisiana & Arkansas

Equipment and Supplies

LOCOMOTIVES

SPOKANE, PORTLAND & SEATTLE.—See Northern Pacific.

THE NATIONAL RAILWAYS of Mexico are inquiring for 18 locomotives; 10 of the 4-6-2 type and 8 of the 2-6-6-2 type.

THE CHICAGO, WEST PULLMAN & SOUTHERN has ordered two locomotives of the 0-6-0 type, from the Baldwin Locomotive Works.

THE NORTHERN PACIFIC has placed orders for 17 locomotives, including 11 of the 4-8-4 type, from the Baldwin Locomotive Works (of which 8 are for the Northern Pacific and 3 for the Spokane, Portland & Seattle), and 6 of the 4-6-6-4 type from the American Locomotive Company for the Spokane, Portland & Seattle. These are in addition to the order for 9 locomotives, reported in the *Railway Age* of January 30.

FREIGHT CARS

THE DULUTH, MISSABE & NORTHERN, has ordered 500 ore cars from the General American Transportation Corp.

THE MISSOURI-KANSAS-TEXAS has ordered 50 Hart selective steel ballast cars of 70 tons capacity from the American Car & Foundry Company.

THE DETROIT, TOLEDO & IRONTON has ordered 750 freight cars—400 box cars from the Greenville Steel Car Company, and 350 automobile cars from the Bethlehem Steel Company. Inquiry for this equipment was reported in the *Railway Age* of February 13.

PASSENGER CARS

THE NORFOLK & WESTERN is inquiring for nine postal cars.

THE ERIE, reported in the *Railway Age* of February 13 as inquiring for 80 milk cars, has ordered this equipment from the Greenville Steel Car Company.

THE GREAT NORTHERN, reported in the *Railway Age* of January 2, as inquiring for 12 coaches, has ordered this equipment from the Pullman-Standard Car Manufacturing Company.

NEW YORK CENTRAL-PENNSYLVANIA—These roads are collaborating on plans now well under way, for the development of new equipment for their fast trains operating between New York and Chicago—the Twentieth Century Limited and the Broadway Limited, respectively. The new equipment will include lounge, sleeping and observation cars, to be built by the Pullman Company, in accordance with designs now being worked out in co-operation with the two railroads.

BOARD OF TRANSPORTATION, CITY OF NEW YORK.—The American Car & Foundry Company and the Pullman-Standard Car Manufacturing Company were awarded the contract on their joint bid to build at a cost of $40,375 per car 150 passenger cars for service on the Independent Subway System, New York. The contract is subject to the approval of the Board of Estimate & Appointment.

IRON AND STEEL

THE ALTON & SOUTHERN has ordered 750 tons of rails for early delivery.

THE LOUISIANA & ARKANSAS has ordered 50 tons of rails for early delivery.

THE DELAWARE & HUDSON has released orders for the delivery on April 1 of 5,000 tons of rails, to be rolled by the Bethlehem Steel Company.

MOTOR VEHICLES

THE SOUTHERN KANSAS GREYHOUND LINES, an affiliate of the Atchison, Topeka & Santa Fe, has ordered from the American Car & Foundry Motors Company two buses powered with Hall-Scott engines.

THE SOUTHERN KANSAS STAGE LINES, an affiliate of the Atchison, Topeka & Santa Fe, has ordered from the American Car & Foundry Motors Company 12 buses equipped with Hall-Scott engines.

Supply Trade

Edward G. Budd Manufacturing Company—Annual Report

The Edward G. Budd Manufacturing Company reported for the year ended December 31, 1936, a net profit of $991,271 after all charges and taxes. This compares with a 1935 profit of $743,412, but the 1936 figure includes a non-recurring income of $635,970 realized from the sale by the Budd International Corporation of its entire interest in the Pressed Steel Company, Ltd.

The 1936 net was equivalent after dividends on preferred stock to 34 cents a share on the 1,656,808 shares of common stock outstanding as compared with the 30 cents a share on 1,060,618 shares in 1935. The balance sheet as of the close of the year listed total current assets of $9,501,188, including $3,778,266 in cash; total current liabilities were $2,783,776.

During the year there was charged to profit and loss $894,000 in connection with the expansion, engineering and development expenditures on the company's Hi-Tensile division in which railway equipment is produced. These developmental expenses, the report points out, are regarded as "an important asset" which "will prove to be worth many times the expenditure." At the time the report was compiled there were on the company's books orders for railroad equipment to the value of $6,300,000. It is pointed out that, while Budd began the production of light-weight stainless-steel trains only three years ago, it was in 1936 "second in the country in volume of orders received for railroad passenger cars."

American Locomotive Company Annual Report

The American Locomotive Company reported for the year ended December 31, 1936, a consolidated net profit of $1,156,658 as compared with a 1935 loss of $1,421,289.

The consolidated income and surplus account for the past two years follows:

CONSOLIDATED INCOME ACCOUNT

	Year Ended Dec. 31, 1936	Year Ended Dec. 31, 1935
Net profit after deducting manufacturing, maintenance and administrative expenses.	$1,815,522	*$776,973
Depreciation on plants and equipment	528,430	534,944
Loss in disposal of fixed assets discarded	7,250	109,410
	$1,279,842	*$1,421,327
Accruals for Federal Taxes—		
Capital stock tax	$41,231	$50,145
Normal income tax	118,318	.....
Surtax on undistributed profits	3,365	.....
	$162,914	$50,145
Profit before adjustments	$1,116,928	*$1,471,472
Income represented by appreciation in the market value of securities previously written down	39,730	50,183
Profit for the period	$1,156,658	*$1,421,289

CONSOLIDATED SURPLUS ACCOUNT

Surplus at beginning of period	$12,118,182	$13,539,471
Profit for the period	1,156,658	*1,421,289
	$13,274,840	$12,118,182
Dividends — Preferred Stock	1,055,883	.....
Surplus at end of period	$12,218,957	$12,118,182
Earned Surplus	$8,040,707	$7,939,933
Capital Surplus	4,178,250	4,178,250

* Loss.

The report reviews briefly the locomotive markets of 1936 when "for the first time since 1930 there was locomotive buying in substantial volume." American received last year orders for 169 locomotives, after having entered the year with orders for 19 carried over from 1935. Last year it built and delivered 65 locomotives, leaving 123 carried over into the present year, during which orders had been received at the time of the report's publication for 75 others—30 of which were purchased from the Montreal Locomotive Works, Ltd., and 45 from American Locomotive Company.

Because the bulk of last year's locomotive business was received "during the last quarter, too late to affect the operating results for the year," the company's locomotive division operated at a loss in 1936. Total unfilled orders in all the company's lines amounted to $21,429,073 on January 1, 1937, as compared with $4,262,937 as of the beginning of the previous year.

During the latter part of last year the company paid a $3 dividend on its preferred stock. The notice of this disbursement stated that the matter of resumption of regular dividends upon the preferred stock and the liquidation of the balance

of the accumulated dividends thereon "will depend upon the future business and earnings of the company."

The Superior Hand Brake Company, Chicago, has moved its offices to the Railway Exchange Building.

A. Van Hassel, who has been elected president of the **Magor Car Corporation,** New York, was born on November 12, 1889, at Paterson, N. J. He was educated in the grammar and high schools of that city, and then was in the service of the Rogers Locomotive Works. He subsequently served with the Cooke Locomotive Works, in Paterson, N. J., and since 1909 has been associated with the Magor Car Corporation, serving in various capacities, until 1921 when he was elected secretary. In March, 1925, be became vice-president, secretary-treasurer; in 1929, he relinquished the office of secretary. Mr. Van

Blank & Stoller

A. Van Hassel

Hassel is also assistant secretary and assistant treasurer of the National Steel Car Corporation, Hamilton, Ont.

Lewis C. Haigh, who has been elected a vice-president of the **Magor Car Corporation,** New York, was born in Brooklyn, N. Y., on January 30, 1898. He received his education in the public schools of New York and East Orange and prepared for college at the St. Paul Academy, St. Paul, Minn. He also attended Wharton School, University of Pennsylvania, for two years. Mr. Haigh entered the service of the Magor Car Corporation early in 1922 in the shops at Passaic, N. J., and one year later joined its sales force in the New York office. Since October, 1929, he served as secretary of the corporation.

Lewis C. Haigh

James W. Leis, who has been elected a vice-president of the **Magor Car Corporation,** with headquarters at Passaic, N. J., began his career in the steel car business 36 years ago. He served with the Pressed

James W. Leis

Steel Car Company in Pittsburgh, Pa., for five years, later at that company's Chicago plant for two years and then in Canada with the Canadian Car & Foundry Company. In 1910, he was appointed plant manager for the Magor Car Corporation, which position he held until his recent election as vice-president.

E. R. Galvin, assistant general sales manager of the **Caterpillar Tractor Company,** Peoria, Ill., has been promoted to general sales manager, **H. P. Mee,** vice-president, having relinquished direct supervision of the sales department to direct all sales, service and advertising activities and to assist in general administration matters. Mr. Galvin entered the employ of the Caterpillar Tractor Company in 1928, after having been employed by DuPont de Nemours as manager of the sporting powder division, and by the Cleveland Tractor Company as general sales manager. Shortly thereafter he became sales manager of the Caterpillar Tractor Company, in charge of the eastern sales division, and in January, 1936, he was promoted to assistant general sales manager, which position he has held until his recent promotion.

J. J. Davis, Jr., sales engineer of the **Carnegie-Illinois Steel Corporation,** with headquarters at Chicago, has been promoted to assistant manager of sales of the railroad materials and commercial forgings division with the same headquarters. He was born on August 3, 1894, at White Pigeon, Mich., and after attending Purdue university and Armour Institute of Technology entered the employ of the Chicago, Burlington & Quincy as a rodman, which position he held from June, 1913, to September of that year. He then entered the employ of the Elgin, Joliet & Eastern at Gary, Ind., where he was a rodman, instrumentman, assistant engineer and supervisor of track during the period until February 15, 1935. On the latter date he entered the general sales

(c) Moffett Studio

J. J. Davis, Jr.

department of the Illinois Steel Company, now the Carnegie-Illinois Steel Corporation, as a sales engineer, and continued in this position until his recent promotion.

John May, who has been promoted to general manager of sales of the **American Steel & Wire Company,** with headquarters at Cleveland, Ohio, entered the employ of this company in 1909 in the order department of the New York sales office. He was transferred to Worcester, Mass., and after a short time returned to

John May

New York, where, after several promotions, he became, in 1921, manager of sales of electric wire and wire rope. In 1931 he was appointed assistant general manager of sales of electric wire and wire rope for the entire country, with headquarters at Worcester, which position he has held until his recent promotion.

OBITUARY

Otto Best, who retired five years ago as superintendent and general manager of the Nathan Manufacturing Company's locomotive appliance factory, died on March 4, in St. Vincent's Hospital, New York, at the age of 70 years. Mr. Best, for many years, prior to his association with the Nathan Manufacturing Company, was air brake instructor of the Nashville, Chatta-

nooga & St. Louis. He was also a past president and, for many years, until the time of his death, was treasurer of the Air Brake Association.

Ralph Atlee Light, vice-president and secretary, of the United States Metallic Packing Company, Philadelphia, Pa., whose sudden death on March 2 was reported in the *Railway Age* of March 6,

Ralph Atlee Light

was born on November 3, 1892, at Wilmington, Del. He was educated in the public schools and the Drexel Institute in Philadelphia, and in the United States Naval Academy. Mr. Light entered the employ of the United States Metallic Packing Company on April 13, 1905. He became secretary of the company on February 9, 1920, and was elected vice-president on February 19, 1934.

TRADE PUBLICATIONS

GEO TRACK CONSTRUCTION.—The Carnegie-Illinois Steel Corporation, Pittsburgh, Pa., has published a 32-page elaborately printed and illustrated brochure containing detailed information on GEO track construction. The advantages claimed for this type of track construction are first outlined, after which its component parts are described, principally by means of detailed drawings. The results of deflection tests are given, and tables show the material required for the construction of one mile of single track.

PIPE REPAIR CLAMPS—Under the title "Repair Clamps and Saddles for Steel and Cast Iron Pipes", the M. B. Skinner Company, South Bend, Ind., has issued a new catalog, No. 36, illustrating and describing the products manufactured by this company. This booklet, comprising 32 6-in. by 9-in. pages, is replete with interesting information regarding methods of repairing practically every known type of pipe line leak. The catalog illustrates, for example, Skinner repair clamps for leaks at screw joints, bell and spigot joints, threads, collars, welds, pin holes and splits in original pipe material, these defects developing in shop, terminal or power plant air lines, water lines, fuel lines and high-pressure steam lines. The latter part of the catalog also describes various types of saddle tees, pipe benders, valve reseaters, seat dressers, etc.

Financial

ARKANSAS VALLEY INTERURBAN.—*Reorganization.*—Robert B. Campbell and Warren E. Brown, trustees of this company, have filed a plan of reorganization with the Federal District Court of Kansas, Second Division, at Wichita, Kan., and with the Interstate Commerce Commission.

ATCHISON, TOPEKA & SANTA FE.—*Bus Line Acquisition.*—The Interstate Commerce Commission, Division 5, has authorized the Santa Fe Trail Stages, Inc., to acquire control of the Rio Grande Stages, Inc., by purchase of the capital stock, subject to the condition that such steps will promptly be taken as are legally possible and necessary (a) to merge properties and operating rights of Rio Grande Stages, Inc., and Santa Fe Trail Stages, Inc., into the Santa Fe Trail Transportation Company; (b) to dissolve Rio Grande Stages, Inc., and Santa Fe Trail Stages, Inc.; and (c) to effect acquisition by the Atchison, Topeka & Santa Fe from the General Improvement Company of all interest which the latter owns in the Santa Fe Trail Transportation Company. The Safeway Lines, Inc., have applied to the Interstate Commerce Commission for authority to purchase the Frank Martz Coach Company, operating as a common carrier of passengers between Chicago, Ill., and Buffalo, N. Y.

BALTIMORE & OHIO.—*Equipment Trust Certificates.*—This company has applied to the Interstate Commerce Commission for authority to assume liability for $7,500,000 of 2½ per cent equipment trust certificates, maturing in 10 equal annual installments on March 1, from 1937 to 1947.

CHICAGO, BURLINGTON & QUINCY.—*Securities.*—The Interstate Commerce Commission, Division 4, has authorized this company to issue $7,000,000 of serial collateral trust notes, series A to J, and $7,873,000 of general mortgage 4 per cent bonds, to be pledged as collateral security for said notes under a collateral-trust indenture. The notes will bear interest at the rate of 2¼ per cent, payable semiannually on June 1 and December 1, and will mature serially in the amount of $700,000 on December 1, from 1937 to 1946. The notes have been sold to the Prudential Insurance Company of America at such price or prices that the average annual cost to the company will not be more than 2.32 per cent. The bonds will mature on March 1, 1958.

CHICAGO, ROCK ISLAND & PACIFIC.—*Reorganization.*—The trustees of this company are opposing the proposed acquisition by the Louisiana & Arkansas of the Rock Island, Arkansas & Louisiana, now a part of the Rock Island system. The trustees have asked the Interstate Commerce Commission to dismiss a pending application by the L. & A. to purchase the line and have asked that, if this is not done, that the proceedings be combined with the Rock Island reorganization case. The commission has granted the trustees' petition to intervene in the L. & A. case.

The Interstate Commerce Commission, Division 4, has issued orders permitting the State of Arkansas and the White & Black River Valley to intervene in the reorganization of the Rock Island.

CUBA.—*Reorganization.*—The federal court in Newark, N. J., has signed an order confirming a plan for the reorganization of this company under the federal bankruptcy act. The plan affects only the holders of the company's 7¼ per cent series A bonds and 6 per cent series B bonds—extending their maturity date from December 1, 1936, to 1946. More than two-thirds of the holdings of each issue accepted the plan.

DULUTH, MISSABE & NORTHERN.—*Equipment Trust Certificates.*—The Interstate Commerce Commission, Division 4, has authorized this company to assume liability for $3,780,000 of 2½ per cent serial equipment trust certificates, maturing in 15 equal annual installments on March 1, from 1938 to 1952. The issue has been sold to the Prudential Insurance Company of America at 101.056, making the average annual cost to the company approximately 2.36 per cent.

INTERNATIONAL RAILWAYS OF CENTRAL AMERICA.—Annual Report.—The 1936 annual report of this company shows net income, after interest and other charges, of $677,980; as compared with net income of $441,836 in 1935, an increase of $236,144. Selected items from the Income Account follow:

	1936	1935	Increase or Decrease
RAILWAY OPERATING REVENUES	$4,951,572	$4,520,934	+$430,637
Maintenance of way	871,796	811,323	+60,473
Maintenance of equipment	644,874	620,282	+24,592
Transportation	943,064	795,369	+147,695
TOTAL OPERATING EXPENSES	3,009,260	2,789,654	+219,605
Operating ratio	60.77	61.71	–.94
NET REVENUE FROM OPERATIONS	1,942,312	1,731,280	+211,032
Railway tax accruals	24,496	10,046	+14,450
Net rents	1,506	1,679	–173
NET RAILWAY OPERATING INCOME	1,919,321	1,722,913	+196,408
Total Other Income	159,061	194,842	–35,780
TOTAL INCOME	2,078,383	1,917,756	+160,627
Interest on funded debt	1,289,433	1,334,041	–44,608
TOTAL FIXED CHARGES	1,392,053	1,457,348	–65,294
NET INCOME	$677,980	$441,836	+$236,144

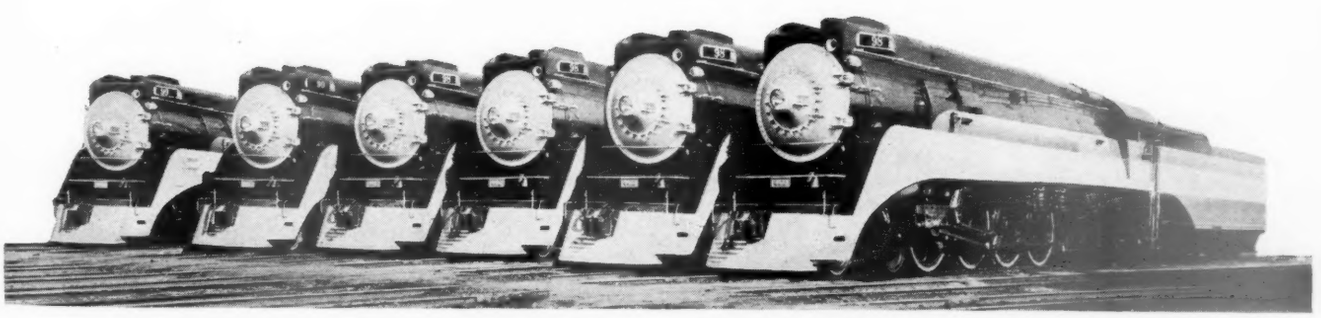
MAINE CENTRAL.—*Acquisition.*—This company has applied to the Interstate Commerce Commission for authority to acquire the Dexter & Newport Railroad by purchase of the capital stock.

MINNEAPOLIS & ST. LOUIS.—*Abandonment.*—Lucien C. Sprague and John Junell, co-receivers, have asked the Inter-

Continued on next left-hand page

THE FIRST SIX of a fleet of 20 streamlined locomotives built and building by Lima for the Southern Pacific Company.

These locomotives are the largest streamlined locomotives in the world.



LIMA LOCOMOTIVE WORKS INCORPORATED

LIMA LOCOMOTIVE WORKS, INCORPORATED, LIMA, OHIO

state Commerce Commission to reopen the following cases of applications for abandonment and dismantlement: from Newburg, Iowa, to Van Cleve, 16.1 miles; from Kalo Junction, Iowa, to Otho, 3.1 miles; from Angus, Iowa, to Berkeley, 4.6 miles; and from Corwith, Iowa, to St. Benedict, 6.6 miles.

MINNEAPOLIS & ST. LOUIS.—*Foreclosure Sale.*—Foreclosure sale of the Minneapolis & St. Louis was postponed for two months when, on March 5, the road was offered for sale for the sixteenth time and no bids were made.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—*R. F. C. Loan Extended.*—The Interstate Commerce Commission, Division 4, has issued an order approving an extension by the Reconstruction Finance Corporation for this company to February 1, 1938, of the time of payment of a loan of $1,221,929 which matured on February 27.

MOBILE & OHIO.—*Abandonment.*—The Interstate Commerce Commission, Division 4, has authorized the receivers to abandon the Dawes branch, extending from Mann., Ala., to Dawes, 7.93 miles.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—*Equipment Trust Certificates.*—The Interstate Commerce Commission, Division 4, has authorized this company to assume liability for $840,000 of 2¼ per cent serial equipment trust certificates, maturing in 15 equal annual installments on March 1, from 1938 to 1952. The issue has been sold to a group composed of Salomon Brothers & Hutzler, Dick & Merle-Smith, and Stroud & Co., Inc., at 96.399, making the annual interest cost to the company approximately 2.764 per cent.

NEW YORK CENTRAL; MICHIGAN CENTRAL; DETROIT, TOLEDO & MILWAUKEE.—*Abandonment.*—These companies have applied to the Interstate Commerce Commission for authority to abandon a branch line of the Detroit, Toledo & Milwaukee extending from Battle Creek, Mich., to Morgan Park, 1.13 miles.

NEW YORK CENTRAL.—*Securities.*—This company has applied to the Interstate Commerce Commission for authority to issue $55,000,000 of 3¼ per cent convertible bonds, due in 1952, the proceeds to be used to redeem an original issue of $59,911,100 of convertible collateral trust 6 per cent notes due in 1944. The new bonds will be convertible into capital stock at $60 a share for 10 years ending on April 30, 1947, unless redeemed before that date. The company has also asked the commission for authority to issue as many shares of common stock as may be required for conversion of the bonds.

Letter to Stockholders.—In a letter dated March 5 to stockholders accompanying notice of a special meeting to be held on March 30, F. E. Williamson, president announced that subject to authorization by the stockholders and the I. C. C. the proposed bonds would be offered first to stockholders. The bonds will mature in 1952, will bear interest at 3¼ per cent, and will be convertible into the capital stock at $60 per share for a period of ten years ending April 30, 1947 unless redeemed before that date. They will be secured by pledge under the indenture of an equal aggregate principal amount of the company's consolidation mortgage 4 per cent bonds, series C, due 1998, and, if the proposed issue exceeds $48,000,000, by the additional pledge of N. Y. C. & H. R. 3½ per cent mortgage bonds, due 1997, in an amount of not to exceed $6,000,000.

PENNSYLVANIA.—*Acquisition of Truck Line.*—The Interstate Commerce Commission, Division 5, has issued an order approving and authorizing, subject to conditions, (a) purchase by the Barker Motor Freight, Inc., of the property and operating rights of the Barker Motor Freight Lines; (b) acquisition of control by the Pennsylvania Truck Lines, Inc., of the Barker Motor Freight, Inc., by purchase of its stock; and (c) acquisition of control by the Pennsylvania Railroad of Pennsylvania Truck Lines, Inc.

ST. LOUIS-SAN FRANCISCO.—*Refuses to Return Deposited Bonds.*—The committee representing prior-lien bondholders of this company, which has 62.5 per cent of the issue on deposit with it, has refused to permit holders to withdraw their deposited bonds except in case of "dire need".

ST. LOUIS SOUTHWESTERN.—*Reorganization.*—The Interstate Commerce Commission, Division 4, has issued an order authorizing the Southern Pacific to intervene in this company's reorganization proceedings. The commission has also permitted the Railroad Credit Corporation to intervene in this company's reorganization proceedings.

SHARON.—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority to extend the maturity date of $164,000 of its first mortgage bonds and $250,000 of first mortgage gold bonds of the New Castle & Shenango Valley for 25 years from January 1, 1937.

SOUTHERN PACIFIC.—*Bus Line Acquisition.*—This company has applied to the Interstate Commerce Commission for authority to purchase the Seacoast Motor Lines, operating in California.

WABASH.—*Notes.*—The Interstate Commerce Commission, Division 4, has authorized this company and its receivers to assume liability as lessees and guarantors for $400,000 of first mortgage 3½ per cent serial notes of the Wabash-Hannibal Bridge Company, maturing serially in eight semi-annual installments of $50,000 each, beginning August 1, and ending February 1, 1941.

Dividends Declared

St. Louis, Rocky Mt. & Pacific.—Common, 25c; Preferred, $1.25, quarterly, both payable March 31 to holders of record March 15.

Southern.—Mobile & Ohio Stock Tr. Certificates.—$2.00, payable April 1 to holders of record March 15.

Average Prices of Stocks and Bonds

	Mar. 9	Last week	Last year
Average price of 20 representative railway stocks..	60.70	58.10	48.83
Average price of 20 representative railway bonds..	84.97	84.23	81.06

Railway Officers

EXECUTIVE

Ralph Simpson, mechanical engineer of the Minneapolis, St. Paul & Sault Ste. Marie, has been appointed to the newly-created position of assistant to the vice-president and general manager, with headquarters as before at Minneapolis, Minn.

E. A. Whitman, vice-president, operation, of the Duluth, South Shore & Atlantic, and **James L. Homire** have been appointed trustees of the D.S.S. & A., effective March 1, by the United States District Court for the district of Minnesota, Fourth division.

FINANCIAL, LEGAL AND ACCOUNTING

L. R. Willis has been appointed assistant general claim agent of the Chesapeake & Ohio, with headquarters at Richmond, Va.

S. H. Barnhart, who has been appointed assistant comptroller of the Norfolk & Western at Roanoke, Va., as noted in the *Railway Age* of March 6, was born at Shepherdstown, W. Va., and was graduated from Shepherd College. Mr. Barnhart entered the service of the Norfolk & Western in 1905 in the Roanoke shops. Since that time he has served successively as machinist apprentice, assistant engineer of tests, wheel shop foreman, engine inspector, assistant roundhouse foreman and assistant valuation engineer. In June, 1929, he was appointed assistant valuation engineer in the valuation department and on August 1, 1933, he was given the position of engineering assistant to the comptroller. Mr. Barnhart was appointed assistant to the comptroller on December 1, 1935.

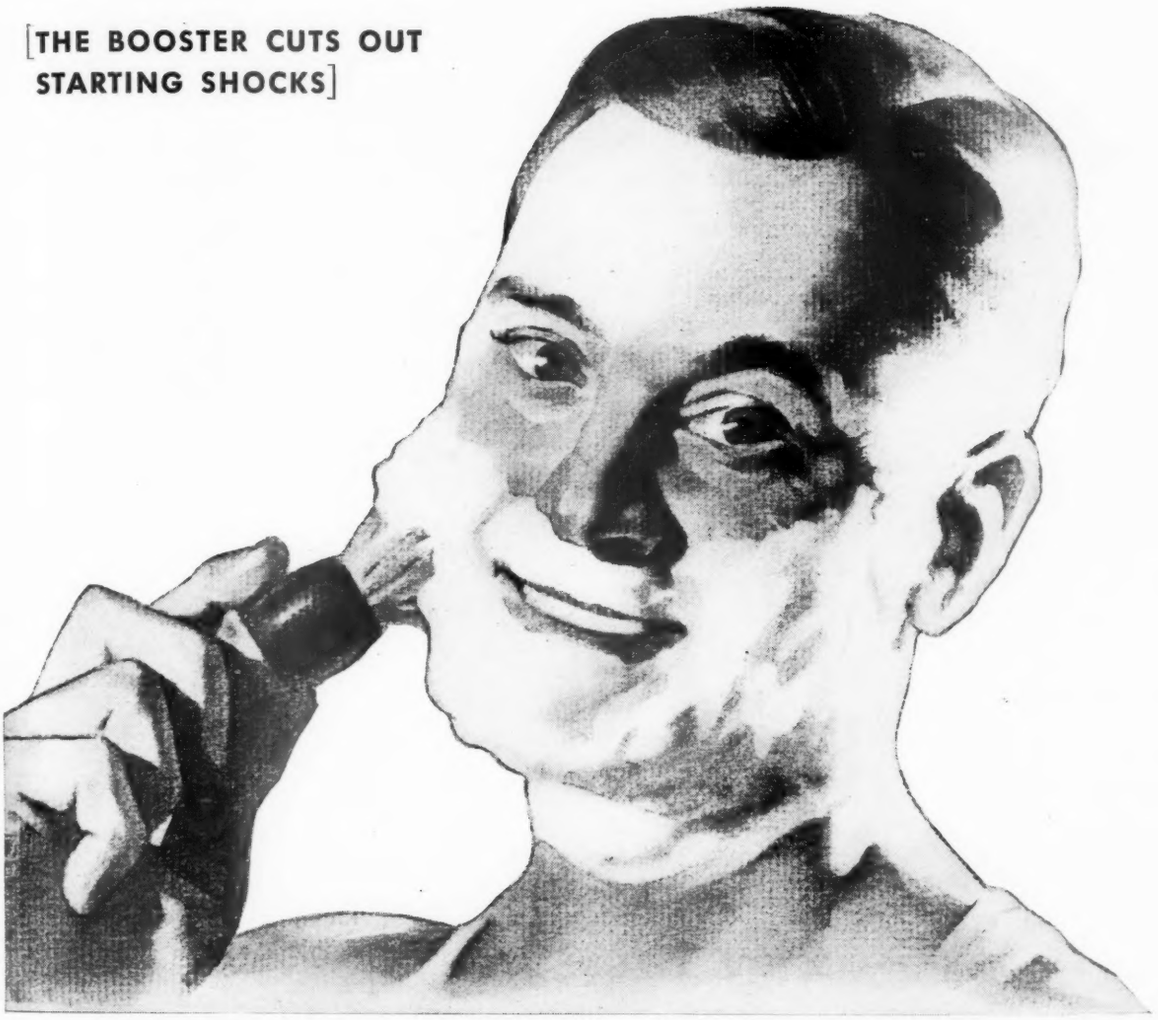
S. H. Barnhart

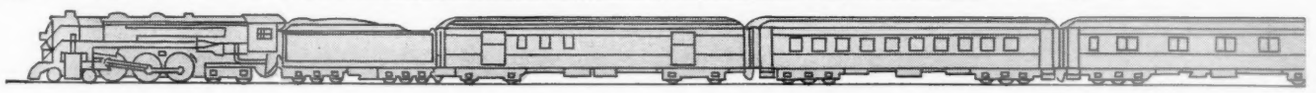
F. G. Minter, who has been appointed assistant comptroller of the Norfolk & Western at Roanoke, Va., as noted in the *Railway Age* of March 6, entered the service of the N. & W. in May, 1911, and served in the traffic department until June, 1918. After four months with the traffic

Continued on next left-hand page

you can't beat a good night's sleep..

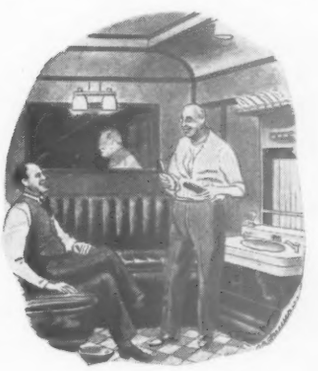
[THE BOOSTER CUTS OUT STARTING SHOCKS]

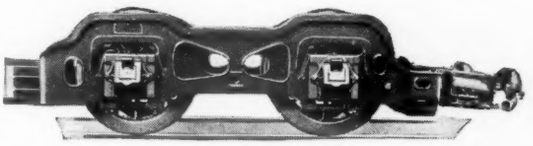




"This train is like the best hotel—without the street noises. There wasn't a single jolt or jar. I slept like a log all night through. You know it is really surprising how smoothly she rolls. We're standing here shaving and you don't have to brace yourself four ways to stay vertical. It's a swell train."

Boosters cut out starting shocks and make the passengers boost railroad travel.





FRANKLIN RAILWAY SUPPLY CO., INC. NEW YORK CHICAGO MONTREAL

department of the Norfolk Southern, during the federal control period, he returned to the Norfolk & Western as a clerk in the comptroller's office on October 15, 1918.

F. G. Minter

He was promoted to special agent to the comptroller in April of the following year, and held that position until March, 1933, when he was appointed special representative of the comptroller. Mr. Minter was appointed assistant to comptroller on December 1, 1935, the position he held at the time of his recent appointment.

OPERATING

L. C. Gram, assistant superintendent on the Tucson division of the Southern Pacific, with headquarters at Tucson, Ariz., effective March 1, was transferred to the Rio Grande division with headquarters at El Paso, Tex., to succeed **J. P. Nash,** who has been transferred to the Tucson division, to replace Mr. Gram.

Clyde K. Sims, whose promotion to superintendent of the River division of the St. Louis-San Francisco was reported in the *Railway Age* of March 6, was born on December 9, 1892, at Galesburg, Ill., and entered railway service on June 9, 1909, with the Chicago, Milwaukee & St. Paul (now the C. M. St. P. & P.), serving as a clerk, stenographer, telegrapher and agent until April, 1909. He entered the service of the St. Louis-San Francisco on May 18, 1918, as a telegrapher on the Eastern division, being promoted to train dispatcher in May, 1919. Subsequently he was advanced to chief dispatcher, and on February 22, 1926, he was promoted to assistant superintendent of the River division. On May 15, 1931, Mr. Sims was transferred to the Northern division, where he remained until his recent appointment as superintendent of the River division, with headquarters at Chaffee, Mo., which was effective on March 1.

TRAFFIC

The headquarters of the freight traffic department of the New York, New Haven & Hartford and the New England Steamship Company are now located at Room 554, South Station, Boston, Mass.

R. W. Balding has been appointed traveling coal freight agent of the Baltimore & Ohio, with headquarters at Buffalo, N. Y., succeeding **H. O. Bias,** whose appointment as coal freight agent at Cincinnati, Ohio was noted in the *Railway Age* of January 9.

J. Harold Becker, division freight agent on the New York Central with headquarters at Detroit, Mich., has been promoted to assistant general freight agent with the same headquarters, to replace **Norbert J Brennan,** who has resigned to accept service with another company.

Fred L. Smart, chief of the commerce bureau of the New York Central at Chicago, effective March 1, was promoted to assistant general freight agent with headquarters at the same point, to succeed **M. S. O'Connor,** who has been transferred to Cleveland to replace **W. T. Tannehill,** who has resigned.

J. W. Stevenson, assistant general passenger agent of the Illinois Central, has been promoted to the newly-created position of assistant passenger traffic manager with headquarters as before at Chicago. **D. J. Hearne,** office manager in the passenger department at Chicago, has been promoted to assistant general passenger agent to succeed Mr. Stevenson. These appointments became effective on March 10.

E. C. Ash, general freight agent of the Alabama, Tennessee & Northern with headquarters at Mobile, Ala., has been promoted to the newly-created position of assistant traffic manager, with the same headquarters. **W. E. Karcher, Jr.,** assistant general freight agent, has been promoted to general freight agent, rates and divisions, at Mobile. These appointments became effective on March 1.

J. C. Cumming, assistant general freight and passenger agent on the Union Pacific at Portland, Ore., has been appointed to the newly-created position of general passenger agent with the same headquarters, and **H. E. Lounsbury,** general freight and passenger agent at Portland, has had his title changed to general freight agent. **J. V. Connett,** passenger and freight traffic agent at Pasadena, Cal., has been promoted to general agent with headquarters at San Pedro, Cal., to succeed **Otto Nilsson,** who has been transferred to Long Beach, Cal., to replace **R. W. Smock,** deceased.

E. G. Baker, assistant general passenger agent of the St. Louis-San Francisco, with headquarters at St. Louis, Mo., has been appointed to the newly-created position of general passenger agent with the same headquarters. **J. B. Morrow,** general agent at Atlanta, Ga., has been appointed to the newly-created position of southeastern passenger agent with the same headquarters, and has been replaced as general agent by **J. W. Mahanay,** traveling freight and passenger agent at Memphis, Tenn. **Alex. W. Arnett,** city passenger agent at Kansas City, Mo., has been appointed general eastern passenger agent at New York, succeeding **A. S. Owen,** district passenger agent. These appointments became effective on March 1.

Jack T. Bate, Pacific Coast representative of the Missouri-Kansas-Texas, has been promoted to the newly-created position of assistant traffic manager, with headquarters as before at Los Angeles, Cal.,

Jack T. Bate

and the position of Pacific Coast representative has been abolished. Mr. Bate's jurisdiction embraces the Los Angeles, San Francisco and Seattle agencies. He was born at Hudson, Mich., on July 18, 1869, and entered railway service with the Katy on January 1, 1889, as a yard clerk at Parsons, Kan. After serving in various clerical capacities at Parsons, Mr. Bate was transferred to McAlester, Okla., as a rate and bill clerk on December 1, 1894, then becoming agent at the same point. On December 1, 1897, he returned to Parsons as traveling freight and passenger agent and on November 1, 1899, he was appointed commercial agent at San Antonio, Tex., being transferred to Denison, Tex., on January 1, 1904, and thence to Los Angeles on January 1, 1906. He was advanced to the position of Pacific Coast representative, with headquarters at San Francisco, on January 1, 1918, and was subsequently transferred to Los Angeles in the same capacity.

Walter J. Kelly, who has been appointed assistant to the vice-president in charge of the traffic department of the As-

Walter J. Kelly

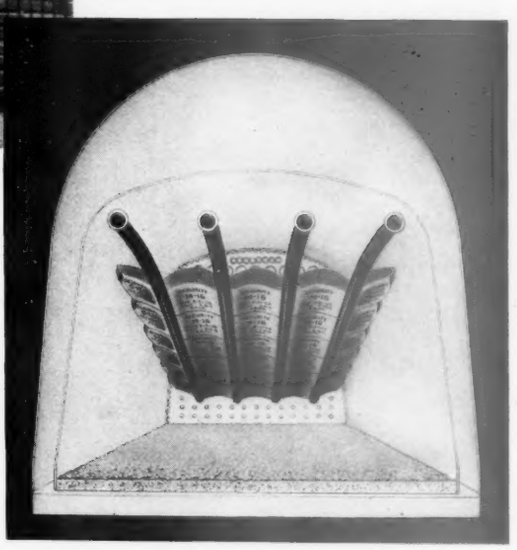
sociation of American Railroads at Washington, D. C., as noted in the *Railway Age* of February 13, was born on June 23,

Continued on next left-hand page

NO. 6 OF A SERIES OF FAMOUS ARCHES OF THE WORLD

ARCH OF TRAJAN, ANCONA

On the majestic arch at Ancona the legible inscriptions that link the names of Trajan and his consort Plotina and his sister Marciana can still be read even though the arch was built A.D. 115. This fine example of Trajanic architecture differs from the Arch of Trajan at Benevento in its narrow proportions, high base and a flight of steps.



The Security Sectional Arch for the locomotive firebox is the fundamental design of all locomotive Brick Arches. Although the Security Arch was first introduced many years ago and the brick arches in modern power are each individual designs, the standard brick sizes and shapes make up the complete arch.

THERE'S MORE TO SECURITY ARCHES THAN JUST BRICK

HARBISON-WALKER REFRACTORIES CO.

Refractory Specialists

AMERICAN ARCH CO.
INCORPORATED

Locomotive Combustion Specialists » » »

1887, at Chicago, Ill. Mr. Kelly entered railroad service on September 1, 1902, with the Illinois Central. In 1907 he became chief claim clerk of the Grand Rapids & Indiana (now Pennsylvania) at Grand Rapids, Mich., later becoming chief clerk in the general freight office. During federal control, he was assigned to the United States Railroad Administration Central Territory Freight Committee, serving as a member of their Advisory Committee and later as tariff publishing agent. With the return of the railroads to private control in 1920, Mr. Kelly was appointed tariff publishing agent of the Central Freight Association and in 1921 was appointed as a member of the auxiliary committee of the Central Freight Association, in which capacity he served until March 1.

A. D. Houston, general agent, traffic department, on the New York, Chicago & St. Louis, with headquarters at Columbus, Ohio, effective March 1, was promoted to assistant to the freight traffic manager, solicitation, with headquarters at Cleveland, Ohio. **R. W. Ruble,** assistant coal freight agent at Cleveland, has been appointed general agent, traffic department, at Columbus, to succeed Mr. Houston.

ENGINEERING AND SIGNALING

D. W. Richards, who has been appointed superintendent of telegraph and signals of the Norfolk & Western, as noted in the *Railway Age* of March 6, was educated in the public schools of Brooklyn, N. Y., and Brooklyn Polytechnic Institute and was graduated from the Massachusetts Institute of Technology in electrical engineering. Mr. Richards installed the first interlocking plant and automatic signals on the Norfolk & Western, and has been in charge of that road's signal work for 36 years. He came to the N. & W. after extensive training in signal activities with the Union Switch & Signal Company and other organizations. Mr. Richards served as signal engineer until his recent appointment.

D. W. Richards

MECHANICAL

E. J. Cyr, general foreman on the Chicago, Burlington & Quincy at Chicago, has been promoted to master mechanic of the McCook division, with headquarters at McCook, Neb., where he will also have jurisdiction over the lines from Holdrege, Neb., to Cheyenne, Wyo., and from Sterling, Colo., to Brush, including the Sterling terminal. He succeeds **C. J. Dietrich,** who has been transferred to the Alliance division, including the lines from Alliance, Neb., to Sterling and from Northport, Neb., to Guernsey, Wyo., of the Sterling division. Mr. Dietrich, whose headquarters will be at Alliance, Neb., will succeed **G. B. Pauley,** who has been transferred to the St. Joseph division, with headquarters at St. Joseph, Mo., where he replaces **G. P. Trachta,** whose appointment as assistant superintendent of motive power on the Chicago, Rock Island & Pacific at Kansas City, Mo., was noted in the *Railway Age* of March 6.

OBITUARY

E. H. Bridger, auditor of freight and telegraph receipts of the Canadian Pacific, with headquarters at Montreal, Que., died of pneumonia in the Western Hospital on March 6. Mr. Bridger was 55 years old.

William J. Rose, who retired in December, 1922, from the position of assistant to the traffic manager of the Eastern region of the Pennsylvania, died on March 8 at Carlisle, Pa., at the age of 85 years.

Edgar Thomason, president of the Piedmont & Northern and the Durham & Southern, with headquarters at Charlotte, N. C., died in that city on March 6 after a short illness. Mr. Thomason was born in Cleveland County, N. C., on February 14, 1869, and entered railway service in 1889 with the Charleston, Cincinnati & Chicago (now part of the Southern) as agent-operator at Earl, N. C. Two years later he was transferred as agent to Blacksburg, S. C., and in 1892 he became chief clerk and traveling auditor. Three years later he was promoted to the position of train dispatcher. From 1896 to 1901, he was general agent of the South Carolina & Georgia Extension (part of Southern). Mr. Thomason was out of railroad service from 1901 to 1903, re-entering railway work on the latter date as commercial agent for the Seaboard Air Line at Atlanta, Ga. In 1904 he entered the service of the Durham & Southern as auditor and assisted in organizing and building that road. He was promoted to assistant to the vice-president of the D. & S. in 1907 and two years later he was promoted to general manager. He left this position in 1911 to help organize and build the Piedmont & Northern, becoming treasurer of that road. In 1912 Mr. Thomason was appointed vice-president and general manager, in which position he served until his election to the presidency of the road on March 31, 1934. In June, 1923, Mr. Thomason was also appointed assistant to the president of the Durham & Southern, later becoming president and general manager of that road.

Edgar Thomason

* * * *

Six-Wheel Switcher Built for the Union Railroad by the Lima Locomotive Works. Weight (Engine and Tender) 371,700 lb; Tractive Force, with Booster, 64,180 lb.

Tables of Revenues and Expenses of Railways begin on next left-hand page

DIE-FORGING *Only*

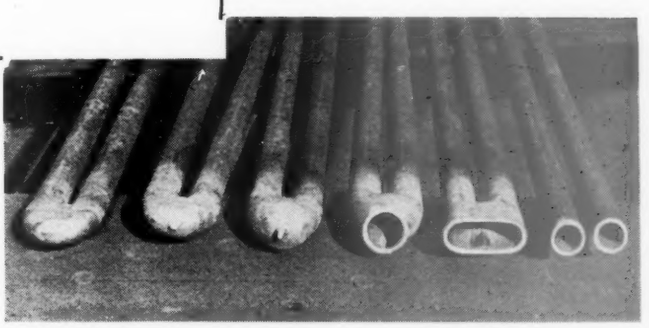
can unify sound straight lengths of *used* superheater tubing into multiple-loop superheater units . . . with controlled invisible and visible surfaces.

* * *

Standardize on the exclusive Elesco RE-manufacturing service for your unserviceable superheater units . . . at a cost of about half that of new units.

DEPENDABLE - ECONOMICAL - EFFICIENT

ELESCO



Steps in the manufacturing process of the return bend—Right to left: Two tubes to be forged together, breeches piece, preliminary swagging, final closing, flattening and finishing.

THE SUPERHEATER COMPANY

Representative of AMERICAN THROTTLE COMPANY, INC.
60 East 42nd Street NEW YORK
Peoples Gas Building CHICAGO
Canada: THE SUPERHEATER COMPANY, LTD., MONTREAL
A-1126

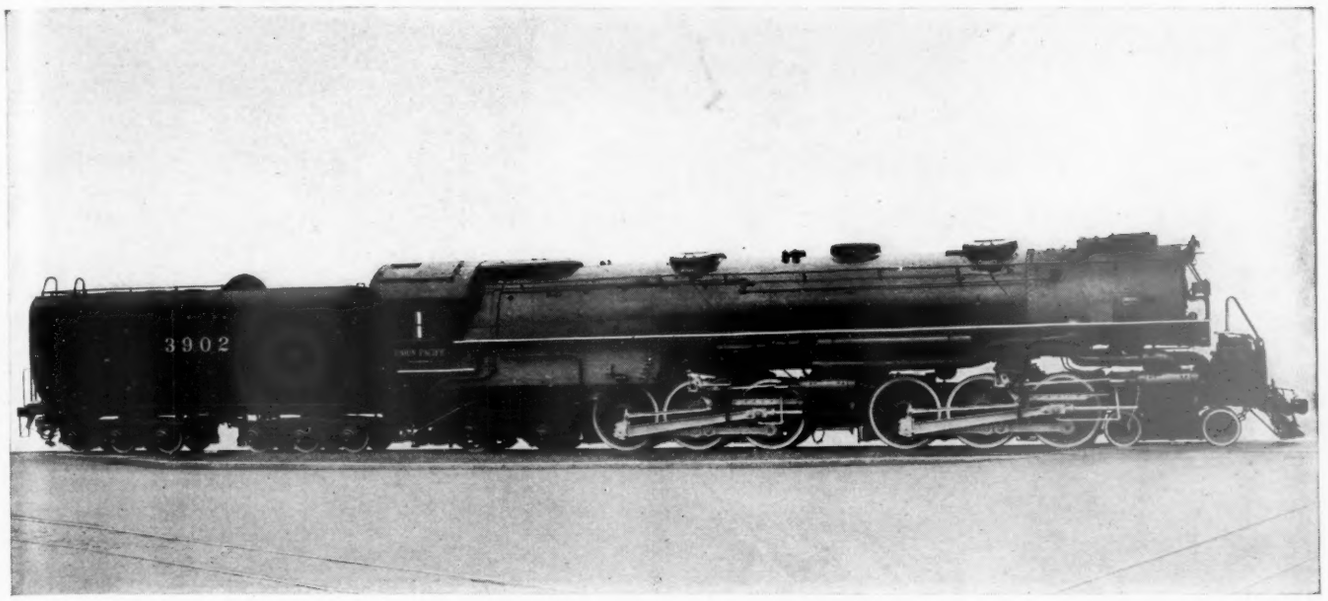
Superheaters - Feed Water Heaters - Exhaust Steam Injectors - Superheated Steam Pyrometers - American Throttles Tangential Steam Dryers

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JANUARY OF CALENDAR YEAR 1937

Name of road		Av. mileage operated during period	Operating revenues			Operating expenses					Operating ratio	Net from railway operation	Operating income	Net railway operating income		
						Maintenance of								After depr.& retir.		Before depr.& ret.
			Freight	Passenger	Total (inc. misc.)	Way and structures	Equipment	Traffic	Transportation	Total				1937	1936	
Akron, Canton & Youngstown	Jan.	171	$178,752	$41	$193,777	$26,136	$12,818	$9,332	$58,752	$117,324	60.5	$76,453	$60,486	$32,489	$45,620	$36,731
Alton	Jan.	956	935,201	203,028	1,321,831	91,420	179,843	53,040	513,160	903,852	68.4	417,979	313,992	150,129	19,898	179,415
Atchison, Topeka & Santa Fe System	Jan.	13,249	10,491,814	1,467,424	12,962,035	1,284,355	3,140,527	421,826	5,178,940	10,506,290	81.1	2,455,745	1,211,687	1,166,367	480,607	2,101,999
Atlanta & West Point	Jan.	93	98,776	26,894	151,512	16,659	38,045	8,304	62,498	137,537	90.8	13,975	4,741	—9,085	—4,560	—381
Western of Alabama	Jan.	133	90,809	26,314	134,159	19,951	38,609	7,346	55,702	132,443	98.7	1,716	—10,257	—7,331	—25	5,022
Atlanta, Birmingham & Coast	Jan.	639	253,238	28,797	313,268	47,445	51,984	21,995	123,572	270,751	86.4	42,517	20,951	4,794	—1,286	16,113
Atlantic Coast Line	Jan.	5,102	3,183,922	955,906	4,613,897	409,776	848,295	154,436	1,752,566	3,398,352	73.7	1,215,545	690,545	528,906	63,556	700,274
Charleston & Western Carolina	Jan.	342	187,267	1,207	193,377	28,533	29,343	6,467	66,826	136,388	70.5	56,989	34,989	30,833	30,750	37,048
Baltimore & Ohio	Jan.	6,471	12,220,216	909,178	13,866,890	1,179,631	3,009,954	350,546	5,030,499	10,273,644	74.1	3,593,246	2,468,064	2,021,049	2,031,324	2,621,441
Staten Island Rapid Transit	Jan.	23	53,243	66,702	126,298	12,258	22,162	1,736	81,934	130,463	103.3	—4,165	—25,765	—33,232	—45,243	—25,814
Bangor & Aroostook	Jan.	603	563,538	25,893	610,523	79,363	89,805	5,382	156,385	360,105	59.0	250,418	188,769	177,109	182,358	199,285
Bessemer & Lake Erie	Jan.	225	823,377	949	840,233	122,754	274,061	11,126	182,362	632,365	75.2	207,868	151,494	231,031	—8,548	304,975
Boston & Maine	Jan.	1,975	2,798,503	620,320	3,934,039	408,123	624,296	62,138	1,506,369	2,793,224	71.0	1,140,815	831,855	593,033	99,128	725,691
Burlington Rock Island	Jan.	255	61,504	15,400	82,307	15,613	13,726	4,380	44,394	86,278	104.8	—3,971	—11,350	—23,262	—25,412	—21,309
Cambria & Indiana	Jan.	37	121,469	.....	121,593	5,361	40,683	413	14,432	67,931	55.88	53,652	11,544	87,612	105,713	104,690
Canadian Pacific Lines in Maine	Jan.	233	260,292	13,824	285,969	15,849	55,738	9,331	98,530	187,416	65.5	98,553	88,350	66,889	8,091	69,005
Canadian Pacific Lines in Vermont	Jan.	85	81,971	11,267	103,477	11,281	28,567	4,148	56,798	106,866	103.3	—3,389	—10,086	—30,247	—55,994	—30,247
Central of Georgia	Jan.	1,926	1,073,177	136,764	1,364,321	168,870	277,627	53,023	572,515	1,162,515	85.2	201,806	95,335	45,365	—348	110,580
Central of New Jersey	Jan.	681	2,106,915	352,308	2,613,237	177,005	534,470	43,864	1,121,608	1,991,143	76.2	622,094	275,704	112,651	257,948	238,262
Central Vermont	Jan.	455	463,833	44,936	555,006	51,379	105,387	15,378	278,505	474,224	85.4	80,782	54,251	16,062	27,229	42,372
Chesapeake & Ohio	Jan.	3,106	8,614,151	263,837	9,185,859	1,075,555	1,751,307	184,820	2,295,533	5,675,529	61.8	3,510,330	2,160,437	2,307,948	3,811,702	2,994,212
Chicago & Eastern Illinois	Jan.	930	1,165,770	132,338	1,446,507	152,431	226,369	57,414	547,094	1,052,470	72.8	394,037	304,037	157,937	89,819	205,301
Chicago & Illinois Midland	Jan.	131	363,768	1,273	371,857	25,501	70,703	21,092	93,636	231,458	62.2	140,399	114,944	107,081	81,315	120,695
Chicago & North Western	Jan.	8,293	4,987,576	942,735	6,634,138	714,941	1,722,889	177,895	3,087,556	6,065,770	91.4	568,368	—127,243	—341,689	85,527	72,160
Chicago, Burlington & Quincy	Jan.	8,976	6,330,265	737,757	7,849,839	729,643	1,599,905	244,020	3,153,725	6,133,444	78.1	1,716,395	992,523	539,779	899,305	940,179
Chicago Great Western	Jan.	1,505	1,388,967	50,932	1,533,877	227,783	255,126	57,917	639,230	1,237,576	80.7	296,301	202,530	—2,549	—27,886	41,140
Chicago, Indianapolis & Louisville	Jan.	575	714,802	55,800	860,869	78,366	202,005	27,949	362,386	710,604	82.5	150,265	100,809	—4,588	64,249	32,440
Chicago, Milwaukee, St. Paul & Pac.	Jan.	11,114	7,037,685	628,804	8,452,815	824,867	1,702,293	213,541	3,584,368	6,696,521	79.2	1,756,294	1,012,294	589,064	855,178	1,037,240
Chicago, Rock Island & Pacific	Jan.	7,532	4,574,638	689,302	5,785,909	660,280	1,116,092	215,260	2,722,566	5,129,656	88.7	656,253	135,797	—149,995	—226,881	190,978
Chicago, Rock Island & Gulf	Jan.	626	223,922	31,870	350,772	37,421	32,690	18,024	130,259	243,588	69.4	107,184	82,019	15,345	19,932	19,109
Chicago, St. Paul, Minn. & Omaha	Jan.	1,648	1,106,524	141,248	1,341,398	113,069	264,628	37,086	818,476	1,314,320	98.0	27,078	—85,277	—192,194	—61,834	—142,810
Clinchfield Railroad	Jan.	309	576,992	4,475	587,091	36,581	116,834	17,785	116,988	303,665	51.7	283,426	236,392	283,063	260,954	321,520
Colorado & Southern	Jan.	956	507,367	34,491	597,413	48,694	116,299	11,358	259,090	470,492	78.8	126,921	59,305	36,644	15,291	67,943
Ft. Worth & Denver City	Jan.	902	442,744	50,821	475,894	43,708	86,378	16,928	173,233	354,350	74.5	121,544	84,582	55,343	72,123	72,531
Columbus & Greenville	Jan.	167	74,359	9,196	90,005	19,442	13,392	3,733	37,239	84,795	94.2	5,210	2,219	1,012	475	3,857
Delaware & Hudson	Jan.	830	1,937,622	100,912	2,121,212	226,008	474,445	45,797	789,329	1,674,555	78.9	446,657	284,445	285,826	146,972	374,996
Delaware, Lackawanna & Western	Jan.	984	3,058,046	585,316	4,093,621	230,488	777,075	115,268	1,947,710	3,261,889	79.7	831,732	451,732	438,318	255,305	649,210
Denver & Rio Grande Western	Jan.	2,576	1,905,196	95,870	2,095,317	165,085	581,158	52,933	861,136	1,760,737	84.0	334,580	125,367	95,076	211,342	195,019
Denver & Salt Lake	Jan.	232	299,594	6,389	316,814	20,990	58,992	2,385	87,381	179,914	56.8	136,900	112,080	128,445	133,668	136,988
Detroit & Mackinac	Jan.	242	49,745	5,084	59,640	7,036	11,907	949	26,043	49,590	83.2	10,050	7,073	1,827	—5,155	4,524
Detroit & Toledo Shore Line	Jan.	50	347,096	.....	349,163	17,848	22,109	8,167	89,661	146,236	41.9	202,927	165,564	104,986	147,584	110,294
Detroit, Toledo & Ironton	Jan.	472	780,508	202	807,303	68,184	94,436	11,343	150,683	345,266	42.8	462,037	378,267	313,845	317,030	334,705
Duluth, Missabe & Northern	Jan.	539	122,056	2,014	146,302	129,116	235,810	3,865	156,907	565,286	386.4	—418,984	—642,390	—649,692	—435,569	—584,414
Duluth, Winnipeg & Pacific	Jan.	178	106,982	1,997	112,211	16,226	19,435	1,941	54,538	96,870	86.3	15,341	6,560	—8,091	17,569	—5,120
Elgin, Joliet & Eastern	Jan.	434	1,579,570	8	1,815,538	141,693	414,267	14,542	680,670	1,305,187	71.9	510,351	374,812	268,241	285,182	341,977
Erie	Jan.	2,284	6,031,371	416,908	6,908,598	461,222	1,316,825	169,693	2,611,110	4,866,444	70.4	2,042,154	1,496,988	1,188,013	918,495	1,506,097

Continued on next left-hand page

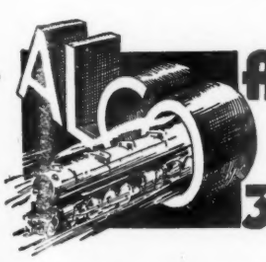


The "CHALLENGER" Type
BUILT FOR UNION PACIFIC

FIFTEEN DELIVERED IN THE FALL OF 1936.
TWENTY-FIVE MORE NOW UNDER ORDER.

NEW POWER—NEW PROFITS

Weight on Drivers,	386,000 pounds	Diameter of Drivers,	69 inches
Weight of Engine,	566,000 pounds	Boiler Pressure,	255 pounds
Cylinders,	22 x 32 inches	Maximum Tractive Power,	97,400 pounds



AMERICAN LOCOMOTIVE COMPANY

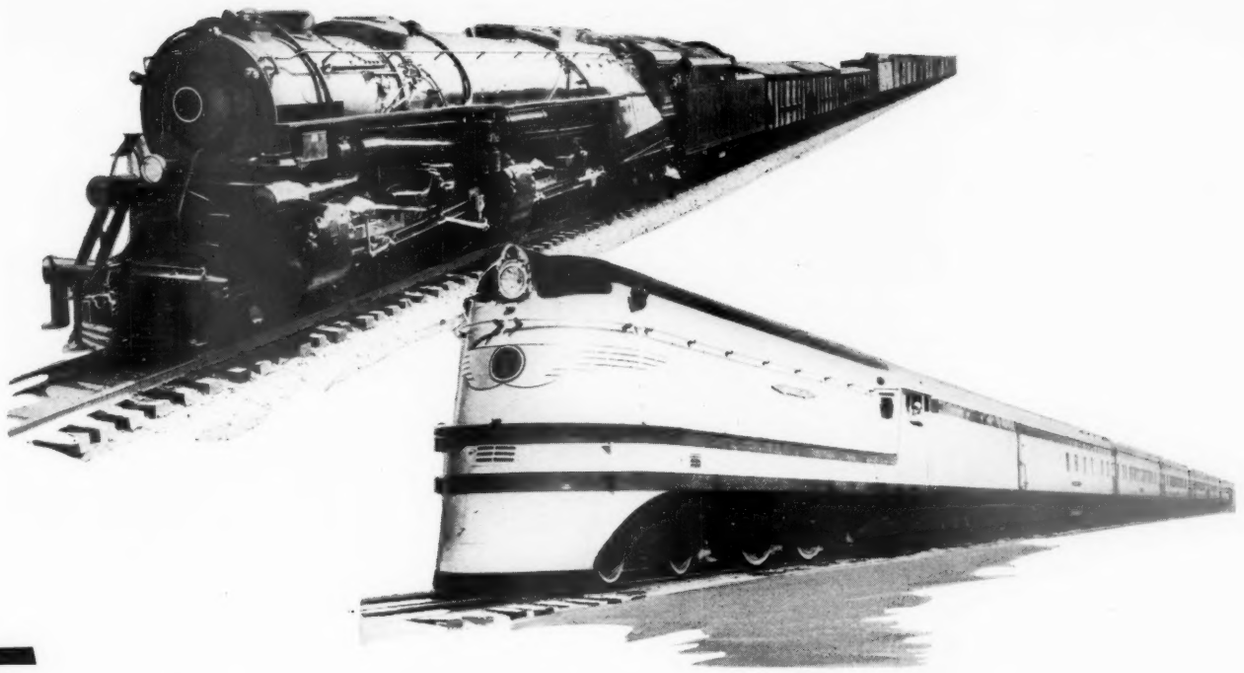
30 CHURCH STREET · NEW YORK · N·Y

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JANUARY OF CALENDAR YEAR 1937—CONTINUED

Name of road	Av. mileage operated during period	Operating revenues: Freight	Passenger	Total (inc. misc.)	Operating expenses: Maintenance of: Way and structures	Equipment	Traffic	Transportation	Total	Operating ratio	Net from railway operation	Operating income	Net railway operating income: After depr.& retir. 1937	1936	Before depr.& ret.
New Jersey & New York.....Jan.	45	$14,024	$45,547	$61,352	$4,363	$15,898	$489	$47,579	$70,014	114.1	—$8,662	—$15,809	—$30,789	—$26,717	—$30,778
New York, Susque. & Western.....Jan.	225	261,100	22,925	295,522	23,052	32,140	4,411	124,364	196,871	66.6	98,651	66,858	37,060	58,756	42,516
Florida East Coast.....Jan.	684	620,868	383,655	1,116,095	97,153	141,265	22,836	352,275	692,983	62.1	423,112	339,096	289,128	146,800	327,836
Fort Smith & Western.....Jan.	249	75,239	867	80,104	14,139	8,560	6,260	24,582	57,771	72.1	22,333	20,833	11,860	11,949	12,426
Georgia Railroad.....Jan.	329	244,863	15,235	284,069	23,628	54,175	18,907	129,128	239,991	84.5	44,078	29,349	40,356	29,109	51,353
Georgia & Florida.....Jan.	408	99,417	2,471	105,928	21,354	16,295	7,608	38,307	89,150	84.2	16,778	9,148	5,609	—10,445	10,860
Grand Trunk Western.....Jan.	1,032	1,583,332	92,664	1,836,060	169,198	369,457	36,648	810,483	1,473,698	80.3	362,362	233,138	37,440	340,062	124,296
Canadian Nat'l Lines in New Eng..Jan.	172	103,440	6,058	120,961	17,392	24,771	2,298	66,111	120,119	99.3	842	—14,099	—44,942	—59,648	—42,017
Great Northern .....Jan.	8,093	4,582,435	363,807	5,444,456	545,949	1,158,208	175,765	2,517,300	4,675,147	85.9	769,309	212,001	184,719	90,206	486,382
Green Bay & Western.....Jan.	234	125,228	677	130,337	25,940	17,794	6,780	47,386	102,091	78.3	28,246	18,743	10,304	15,025	14,445
Gulf & Ship Island.....Jan.	259	79,405	9,366	99,221	17,095	15,147	3,594	56,381	98,512	99.3	709	—16,914	—26,137	—22,920	—22,505
Gulf, Mobile & Northern.....Jan.	936	508,518	25,121	556,638	70,932	82,021	38,155	164,105	386,112	69.36	170,526	122,526	61,968	71,972	75,222
Illinois Central.....Jan.	4,966	6,344,005	850,206	7,742,095	746,549	1,727,144	247,429	3,373,795	6,558,362	84.7	1,183,733	469,537	246,584	1,007,778	778,333
Yazoo & Mississippi Valley .....Jan.	1,619	1,119,337	87,067	1,287,558	115,692	203,072	39,630	490,336	912,065	70.8	375,493	223,462	143,822	—38,995	183,988
Illinois Central System.....Jan.	6,586	7,463,342	937,273	9,029,653	862,241	1,930,216	287,059	3,864,131	7,470,427	82.7	1,559,226	690,945	400,706	973,783	972,621
Illinois Terminal .....Jan.	504	397,951	70,902	506,719	42,636	82,213	16,017	167,722	328,702	64.87	178,017	137,413	110,958	125,668	129,728
Kansas City Southern.....Jan.	878	991,176	17,490	1,118,470	116,736	167,772	50,110	353,829	755,904	67.6	362,566	252,566	191,664	187,014	220,970
Kansas, Oklahoma & Gulf.....Jan.	326	187,227	739	190,371	17,298	10,128	8,971	41,221	86,698	45.5	103,673	86,718	71,379	79,515	73,473
Lake Superior & Ishpeming.....Jan.	156	42,922	111	45,349	18,500	25,864	740	24,482	75,991	167.6	—30,642	—49,748	—49,834	—56,892	—36,599
Lehigh & Hudson River.....Jan.	96	130,133	114	131,065	12,896	21,888	3,817	45,098	91,296	69.7	39,769	26,195	14,711	9,547	18,382
Lehigh & New England.....Jan.	215	293,643	212	296,072	29,262	83,873	7,095	117,509	253,217	85.5	42,855	28,437	32,613	54,697	51,555
Lehigh Valley .....Jan.	1,322	3,662,199	229,938	4,129,608	262,206	838,849	115,820	1,808,386	3,200,794	77.5	928,814	626,035	398,423	486,393	589,198
Louisiana & Arkansas.....Jan.	606	416,667	8,320	441,363	53,805	60,986	28,961	142,442	307,163	69.6	134,200	101,194	81,936	109,720	98,715
Louisiana, Arkansas & Texas.....Jan.	255	89,587	228	93,729	22,044	9,792	4,562	38,168	80,751	86.2	12,978	7,835	—8,100	7,963	—7,334
Louisville & Nashville.....Jan.	4,943	5,683,508	565,418	6,713,924	725,251	1,623,588	205,207	2,499,336	5,369,060	80.0	1,344,864	788,300	907,133	1,289,842	1,255,118
Maine Central .....Jan.	1,009	895,910	81,426	1,065,321	143,501	177,252	14,995	389,019	763,349	71.7	301,972	232,865	164,857	19,933	208,082
Midland Valley .....Jan.	351	138,630	21	140,625	9,224	8,068	2,571	33,561	59,614	42.4	81,011	71,160	60,697	70,076	62,837
Minneapolis & St. Louis.....Jan.	1,530	561,690	13,196	608,646	60,503	119,470	42,431	311,471	578,862	95.1	29,784	3,038	—50,689	26,616	—25,133
Minneapolis, St. Paul & S. S. Marie..Jan.	4,301	1,636,452	95,765	1,881,388	235,198	416,765	61,450	965,648	1,779,891	94.6	101,497	—70,589	—195,286	—101,546	—91,954
Duluth, South Shore & Atlantic....Jan.	549	151,513	15,405	178,590	27,726	37,586	4,293	85,967	159,928	89.6	18,662	5,080	—4,493	—7,942	2,864
Spokane International .....Jan.	163	51,549	1,563	59,059	15,039	6,340	1,761	24,827	53,637	90.8	5,422	487	—2,517	3,592	—880
Mississippi Central .....Jan.	150	69,145	2,036	73,551	18,758	13,171	6,678	21,280	65,243	88.7	8,308	3,481	—1,165	5,726	1,064
Missouri & Arkansas.....Jan.	364	76,074	1,428	83,055	28,425	11,511	5,122	32,377	81,920	98.6	1,135	—2,499	—12,763	—2,751	—11,895
Missouri-Illinois .....Jan.	205	99,785	633	102,155	18,544	11,345	2,949	36,356	74,419	72.8	27,736	21,380	8,729	9,749	11,865
Missouri-Kansas-Texas Line.....Jan.	3,293	1,943,248	197,208	2,365,757	249,844	311,688	128,161	966,436	1,814,409	76.7	551,348	456,623	234,808	96,154	333,182
Missouri Pacific .....Jan.	7,171	6,483,343	494,219	7,554,596	738,254	1,471,490	253,008	3,046,936	5,837,792	77.3	1,716,804	1,213,895	743,416	821,671	1,107,582
Gulf Coast Lines.....Jan.	1,763	1,500,810	41,476	1,602,263	153,810	196,922	47,763	431,495	879,889	54.92	722,374	648,036	454,679	219,737	489,911
International Great Northern.....Jan.	1,154	851,793	91,877	1,040,064	142,217	201,261	32,085	460,407	895,422	86.09	144,642	84,526	—17,302	14,413	14,961
Mobile & Ohio.....Jan.	1,201	768,260	31,613	848,149	109,177	160,757	44,735	370,107	728,495	85.9	119,654	62,454	14,445	13,774	64,796
Monongahela .....Jan.	171	431,589	857	436,114	42,735	32,030	453	93,197	171,570	39.3	264,544	230,218	141,436	78,975	146,943
Montour .....Jan.	57	161,833	.....	163,892	9,605	35,641	969	50,789	104,462	63.7	59,430	41,914	54,850	68,863	65,885
Nashville, Chattanooga & St. Louis....Jan.	1,130	866,433	121,487	1,161,066	131,157	299,604	60,891	479,907	1,037,717	89.4	123,349	24,008	26,477	37,160	68,824
Nevada Northern .....Jan.	165	44,462	1,361	50,690	8,185	3,705	1,159	12,056	29,406	58.0	21,284	13,552	15,153	16,119	21,107
New York Central .....Jan.	11,221	21,090,512	5,789,389	29,902,526	2,589,714	6,251,538	553,647	11,767,263	22,752,993	76.1	7,149,533	5,126,902	3,863,703	2,658,931	5,194,252
Pittsburgh & Lake Erie.....Jan.	233	1,886,088	59,740	2,001,803	142,534	757,326	29,497	658,285	1,676,282	83.7	325,521	169,582	340,325	191,259	482,975
New York, Chicago & St. Louis.....Jan.	1,704	3,527,392	73,851	3,708,613	372,155	581,114	115,972	1,230,132	2,435,235	65.7	1,273,378	995,829	704,775	643,669	839,173

Continued on next left-hand page



For Heavy Duty Freight and High Speed Passenger Service

LARGE savings in fuel and maintenance on all types of modern locomotives are assured when the vital wearing parts are made of HUNT-SPILLER *Air Furnace* GUN IRON.

The wear-resisting qualities of H S G I parts insure long, trouble-free service and consequently lower cost of operation.

Intensive service conditions of today make it imperative that your locomotives be equipped with H S G I parts. The more completely equipped—the greater your savings.

H S G I
Reg. U. S. Trade Mark

Cylinder Bushings
Cylinder Packing Rings
Pistons or Piston Bull Rings
Valve Bushings
Valve Packing Rings
Valve Bull Rings
Crosshead Shoes
Hub Liners
Shoes and Wedges
Floating Rod Bushings

Parts Finished For Application

Dunbar Sectional Type Packing
Duplex Sectional Type Packing for Cylinders and Valves
(Duplex Springs for Above Sectional Packing)
Cylinder Snap Rings
Valve Rings All Shapes

HUNT-SPILLER MFG. CORPORATION
V. W. Ellet Pres. & Gen. Mgr. / E. J. Fuller Vice-President

Office & Works
383 Dorchester Ave. South Boston, Mass.
Canadian Representative: Joseph Robb & Co., Ltd., 5575 Cote St. Paul Rd., Montreal, P.Q.
Export Agent for Latin America:
International Rwy. Supply Co., 30 Church Street, New York, N. Y.

HUNT-SPILLER GUN IRON
Air Furnace

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JANUARY OF CALENDAR YEAR 1937—CONTINUED

Name of road		Av. mileage operated during period	Operating revenues: Freight	Passenger	Total (inc. misc.)	Operating expenses: Maintenance of: Way and structures	Equipment	Traffic	Transportation	Total	Operating ratio	Net from railway operation	Operating income	Net railway operating income: After depr.& retir. 1937	1936	Before depr.& ret.
New York, New Haven & Hartford	Jan.	2,033	$3,852,104	$2,137,353	$6,706,910	$615,369	$1,148,002	$108,460	$2,556,793	$4,891,462	72.9	$1,815,448	$1,315,448	$698,114	$509,101	$983,449
New York Connecting	Jan.	20	251,482	.....	258,963	12,742	5,587	.....	19,379	38,765	15.0	220,198	182,923	163,836	121,841	163,836
New York, Ontario & Western	Jan.	576	544,181	7,253	597,656	62,300	127,453	11,002	283,748	507,937	85.0	89,719	38,095	—17,836	133,844	6,597
Norfolk & Western	Jan.	2,204	7,118,291	193,015	7,511,754	958,027	1,347,563	137,393	1,738,146	4,410,710	58.7	3,101,044	1,955,753	2,258,281	2,355,950	2,644,857
Norfolk Southern	Jan.	834	288,937	6,736	311,310	68,146	49,993	20,411	134,244	294,475	94.6	16,835	—16,396	—28,025	—5,009	—17,031
Northern Pacific	Jan.	6,726	3,841,510	336,787	4,611,936	417,274	978,495	146,079	2,148,966	4,045,148	87.7	566,788	3,082	397,364	—55,401	665,846
Northwestern Pacific	Jan.	351	189,260	58,813	275,348	53,708	50,204	3,865	163,226	285,577	103.7	—10,229	—22,776	—32,889	—2,775	—19,274
Oklahoma City-Ada-Atoka	Jan.	132	40,169	500	43,075	11,211	977	865	10,999	25,933	60.2	17,142	14,320	7,464	21,412	7,471
Pennsylvania	Jan.	10,308	28,294,553	6,479,909	37,824,118	4,062,665	8,855,362	682,097	13,862,007	29,520,546	78.0	8,303,572	5,259,916	4,815,538	5,309,806	6,829,946
Long Island	Jan.	396	523,071	1,293,688	1,897,304	220,984	439,541	18,360	996,276	1,767,704	93.2	129,605	—45,922	—201,094	—108,739	—103,378
Pennsylvania-Reading Seashore Lines	Jan.	412	244,378	93,195	356,204	54,896	79,767	8,444	266,173	437,628	122.9	—81,424	—153,276	—225,396	—193,917	—218,143
Pere Marquette	Jan.	2,115	2,033,138	84,123	2,254,245	299,336	514,618	67,054	934,738	1,913,642	84.9	340,603	154,029	40,692	351,299	253,715
Pittsburg & Shawmut	Jan.	100	69,356	436	70,537	15,197	24,624	1,271	20,166	65,127	92.3	5,410	3,097	4,517	4,810	8,848
Pittsburgh & West Virginia	Jan.	138	324,766	2,478	346,678	50,514	77,002	18,555	70,185	241,120	69.6	105,558	76,424	102,281	101,491	123,949
Pittsburg, Shawmut & Northern	Jan.	190	85,972	15	87,358	13,817	20,803	1,316	34,519	77,099	88.2	10,259	7,575	1,622	211	3,516
Reading	Jan.	1,455	4,602,231	317,189	5,133,617	334,810	1,074,911	76,339	1,954,023	3,661,848	71.3	1,471,769	1,038,800	1,067,844	1,041,834	1,327,893
Richmond, Fredericksburg & Potomac	Jan.	117	398,188	304,760	835,681	67,252	130,556	9,136	310,846	569,542	68.2	266,139	198,386	133,053	3,614	159,085
Rutland	Jan.	407	175,905	35,691	277,345	37,391	64,984	10,193	140,790	270,829	97.7	6,516	—10,520	—10,282	—31,206	1,051
St. Louis-San Francisco	Jan.	4,926	3,331,966	338,305	4,080,403	592,918	909,928	111,623	1,585,957	3,404,551	83.4	675,852	315,528	292,926	417,611	555,099
Fort Worth & Rio Grande	Jan.	233	28,874	382	35,151	12,823	6,031	2,462	23,376	47,208	134.3	—12,057	—16,839	—23,040	—27,341	—22,989
St. Louis, San Francisco & Texas	Jan.	261	81,452	1	85,712	27,289	13,005	5,310	55,413	107,029	124.9	—21,317	—28,690	—63,665	—56,225	—63,563
St. Louis Southwestern Lines	Jan.	1,749	1,604,402	29,773	1,705,623	224,240	302,009	81,845	587,287	1,276,904	74.9	428,719	318,870	146,860	207,072	197,590
Seaboard Air Line	Jan.	4,307	2,993,808	662,856	4,029,385	455,427	706,491	169,260	1,427,523	2,970,099	73.7	1,059,286	759,286	566,682	63,582	724,328
Southern Railway	Jan.	6,639	6,465,724	954,542	8,133,015	985,185	1,544,135	151,907	2,869,517	5,867,437	72.1	2,265,578	1,715,536	1,349,956	1,334,307	1,617,137
Alabama Great Southern	Jan.	315	459,576	58,250	559,703	91,175	130,888	12,122	175,563	430,895	77.0	128,808	81,913	56,897	44,780	80,296
Cinn., New Orleans & Texas Pacific	Jan.	336	1,053,234	156,971	1,296,081	209,768	306,735	25,530	337,123	937,531	72.3	358,550	240,757	217,499	311,601	267,714
Georgia Southern & Florida	Jan.	397	135,705	79,809	240,040	30,994	36,081	1,851	84,423	164,166	68.4	75,874	61,750	60,716	23,053	67,732
New Orleans & Northeastern	Jan.	204	209,540	23,007	249,921	31,300	38,167	5,442	76,725	162,048	64.8	87,873	60,206	41,873	—6,113	47,960
Northern Alabama	Jan.	100	62,185	2,037	66,252	10,522	1,762	1,211	21,776	37,206	56.2	29,046	24,448	11,582	13,415	11,652
Southern Pacific	Jan.	8,772	11,331,339	1,883,674	14,274,677	1,300,525	2,264,055	331,491	5,850,665	10,701,486	75.0	3,573,191	2,674,531	2,022,645	688,389	2,511,534
Southern Pacific Steamship Lines	Jan.	....	674,678	15,538	712,785	15,339	91,589	15,672	492,438	633,905	88.9	78,880	71,329	69,832	—66,224	104,940
Texas & New Orleans	Jan.	4,429	3,537,099	299,401	4,111,544	512,149	618,426	123,121	1,354,389	2,859,566	69.5	1,251,978	1,012,434	802,981	241,789	936,999
Spokane, Portland & Seattle	Jan.	946	585,145	36,626	670,240	58,263	75,293	9,478	287,097	460,078	68.6	210,162	144,129	88,711	21,616	103,987
Tennessee Central	Jan.	286	186,539	4,286	201,825	31,637	30,323	5,585	72,326	149,646	74.1	52,179	46,053	29,530	53,716	35,474
Texas & Pacific	Jan.	1,948	1,941,988	224,143	2,345,668	244,578	429,303	79,384	758,058	1,653,546	70.5	692,122	540,360	392,446	342,679	489,953
Texas Mexican	Jan.	162	102,322	400	113,660	18,269	15,614	3,458	35,975	80,899	71.2	32,761	25,849	20,458	17,514	22,301
Toledo, Peoria & Western	Jan.	239	185,951	1	188,252	35,353	12,223	17,606	49,352	124,245	66.0	64,007	51,159	34,882	24,443	47,934
Union Pacific System	Jan.	9,918	10,193,635	1,242,753	12,501,622	1,047,112	2,673,984	328,349	4,901,611	9,787,086	78.3	2,714,536	1,456,576	921,403	911,557	1,473,019
Utah	Jan.	111	193,095	.....	193,367	24,836	59,709	404	48,958	138,470	71.6	54,897	36,134	27,832	34,832	37,726
Virginian	Jan.	619	1,581,297	3,722	1,655,799	106,538	279,905	21,882	261,146	699,030	42.2	956,769	736,769	801,156	690,157	895,896
Wabash	Jan.	2,446	3,453,300	222,522	3,926,431	375,364	740,863	149,895	1,464,199	2,862,035	72.9	1,064,396	842,418	519,208	355,321	696,069
Ann Arbor	Jan.	293	327,825	2,996	337,723	20,332	92,940	12,102	148,859	282,948	83.8	54,775	34,762	19,713	21,776	39,640
Western Maryland	Jan.	882	1,494,085	6,960	1,536,824	174,156	333,424	40,615	380,155	979,228	63.7	557,596	452,596	458,303	402,554	550,589
Western Pacific	Jan.	1,207	1,193,595	28,954	1,250,646	110,596	263,602	57,989	536,220	1,016,804	81.3	233,842	144,586	64,893	—33,339	117,139
Wheeling & Lake Erie	Jan.	512	1,205,220	1,824	1,263,431	135,627	256,626	32,733	395,169	850,689	67.3	412,742	263,056	354,050	201,685	426,421
Wichita Falls & Southern	Jan.															

(CLASS No. 2 ROAD)